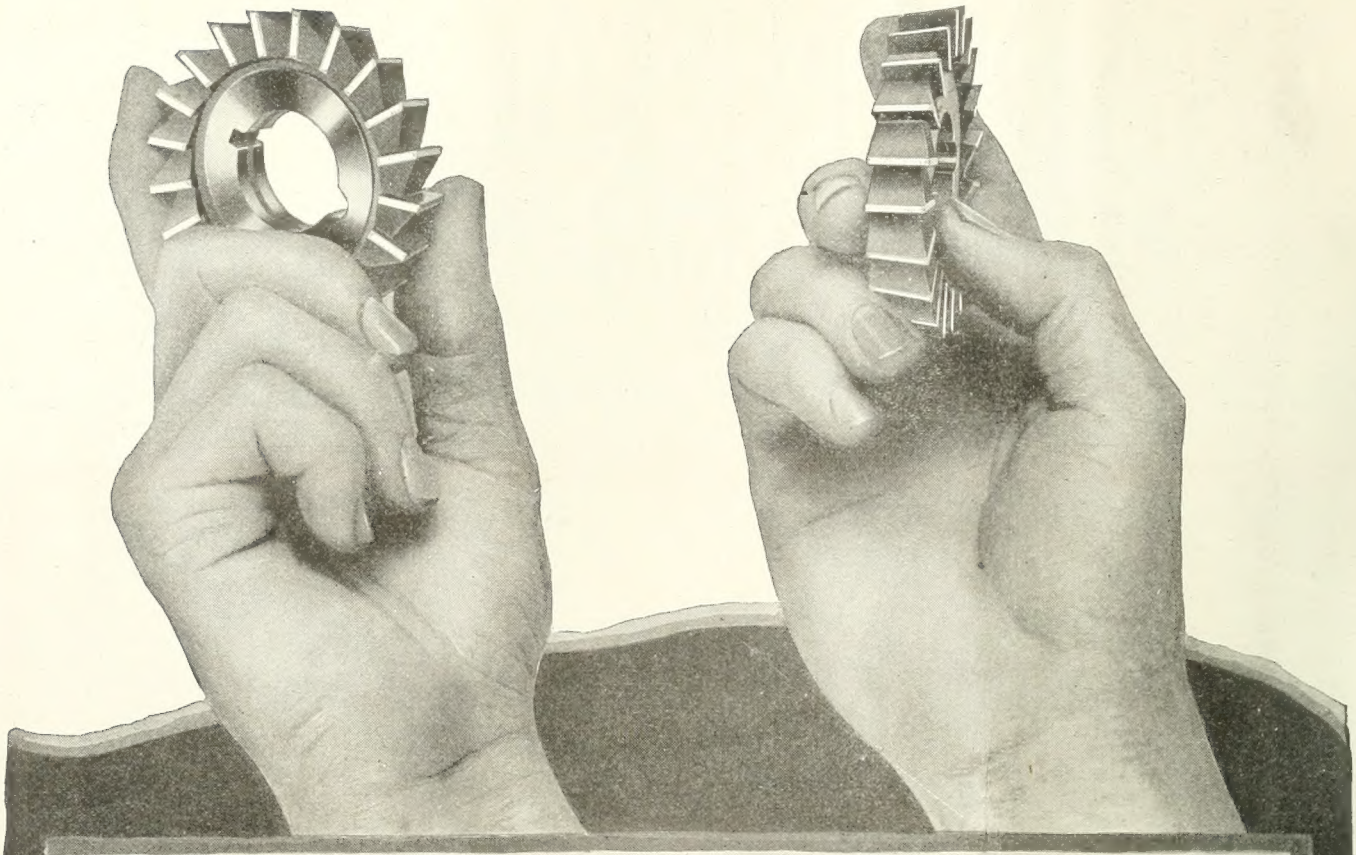
EXPORT NUMBER

EDITORIAL INDEX—PAGE 358
ADVERTISING INDEX—PAGE 160
BUYERS' DIRECTORY—PAGE 141

CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
Published by the MacLean Publishing Company, Limited, Toronto, Canada

Vol. XXII., No. 14 Publication Office: Toronto, October 2, 1919. Subscription Price $3.00 per year.



If it's speed you need—

One trial will prove the advantage of Pratt & Whitney Milling Cutters. No matter what the nature of the work they will give you the highest production the machine is capable of.

They're designed for free, fast cutting. And tempered and seasoned to last longer.

PRATT & WHITNEY MILLING CUTTERS

Ask us for prices and details on Plain Milling Cutters, Side Milling Cutters, Inserted Blade End and Side Cutters, Screw Slot Cutters, Coarse Tooth Side or Plain Milling Cutters, Involute Gear Cutters, Concave, Convex, and Double Angle Cutters, Cutters for Spiral Mills, Roll Thread Die Hobs, Key-seating and Slotting Cutters, Straight and Spiral Cut End Mills (B. & S. and M. T. Shank), Spiral and Straight Shell End Mills, etc.

And we make formed cutters for special work also. All are backed by the guarantee for goodness that the P. & W. trademark indicates.

Where you can buy them—

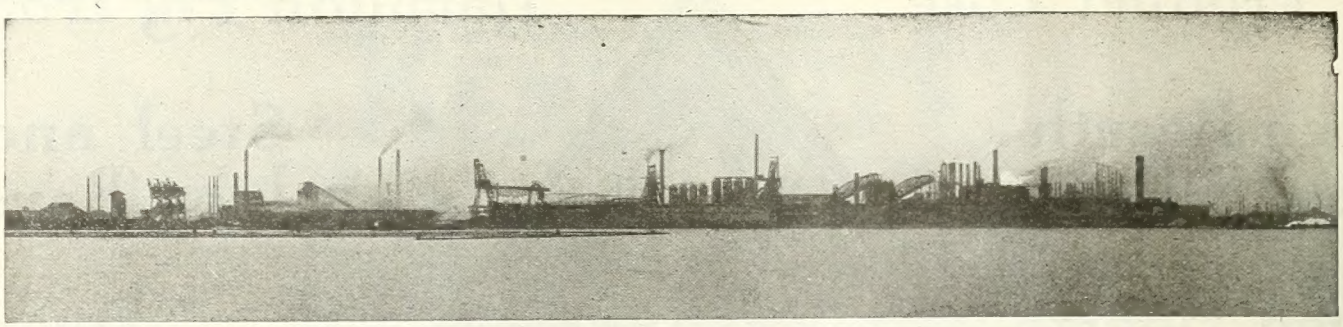
Boston: 93-95 Oliver St. Philadelphia: 405 N. 21st St. Pittsburgh: Frick Bldg. Cleveland, O.; The Niles Tool Works Co., 338 W. Fourth St. Detroit: Kerr Bldg. Chicago: 571 Washington Blvd. St. Louis: 516 N. Third St. Birmingham, Ala.: 2015 First Ave. San Francisco: 16 to 18 Fremont St. For Canada: Pratt & Whitney Co. of Canada, Ltd., Dundas, Montreal, Toronto, Winnipeg and Vancouver.

PRATT & WHITNEY COMPANY OF CANADA, LIMITED

Works : DUNDAS, Ontario

MONTREAL	TORONTO	WINNIPEG	HALIFAX	VANCOUVER
723 Drummond Bldg.	1002 C.P.R. Bldg.	1205 McArthur Bldg.	Davidson Bldg.	B.C. Equipment Co.

Canadian Machinery and Manufacturing News, October 2nd, 1919. Vol. 22, No. 14. Published weekly at 143-153 University Ave., Toronto, Canada. Subscription price in Canada, 3.00; United States, $3.50. Entered as second-class matter at the Post Office Department, Ottawa, Canada. Entered as second-class matter July 1, 1912, at the Post Office at Buffalo, under the Act of March 3rd, 1879.



General View of the Plant of the Algoma Steel Corporation from the Waterfront.

ANNOUNCEMENT

THE ALGOMA STEEL CORPORATION, LIMITED, take pleasure in announcing to their customers and the Canadian trade that in accordance with the widespread desire throughout the Dominion that there should be obtained in Canada with Canadian labor, a much larger proportion of the requirements of this country in STEEL SECTIONS for STRUCTURAL PURPOSES, CAR CONSTRUCTION, SHIPBUILDERS' REQUIREMENTS, etc., they are just completing extensive alterations and additions to their rolling mills, and on or about 1ST NOVEMBER, will be ready to produce and ship American Standard Sections of BEAMS and CHANNELS up to and including 15", all standard sections of ANGLES from 6" x 6" down to 1¼" x 1¼", ZEE BARS for car builders and general purposes, small and large ROUNDS and SQUARES, and FLAT BARS up to 14" wide. The quality of the product is already well known to the trade, and is exclusively steel made by the Open Hearth process. and can be furnished in all grades from the softest rivet stock to high carbon special spring material. Motto: **"Quality and Service."**

MARK OF ALGOMA O.H. QUALITY

The following are the sections which will be rolled:---

ANGLES—Equal Leg—
6 x 6"—5 x 5"—4 x 4"
3½ x 3½"—3 x 3"
2½ x 2½"—2¼ x 2¼"
2 x 2"—1¾ x 1¾"
1½ x 1½"—1¼ x 1¼"

ANGLES—Unequal Leg—
6 x 4"—6 x 3½"—5 x 4"
5 x 3½"—5 x 3"—4½ x 3"
4 x 3½"—4 x 3"—3½ x 3"
3½ x 2½"—3 x 2½"—3 x 2"
2½ x 2"

BEAMS—
15", 12", 10", 8", 6", 5", 4", 3".

CHANNELS—
15", 13", 12", 10", 8", 6", 5", 4", 3".

ZEES—
3¼ x 5 x 3¼ x 5/16
3 5/16 x 5 1/16 x 3 5/16 x ⅜"
3⅜ x 5⅛ x 3⅜ x 7/16"
3 1/16 x 4 x 3 1/16 x ¼"
3⅛ x 4 1/16 x 3⅛ x 5/16"
3 3/16 x 4⅛ x 3 3/16 x ⅜"
2 11/16 x 3 x 2 11/16 x ¼"
2¾ x 3 1/16 x 2¾ x 5/16"

ROUNDS—
All sizes from ½" up to and including 4".

SQUARES—
All sizes from ½" up to and including 3".

FLATS—
All sizes from 1 x ¼" up to and including 14" wide.

MINE RAILS—
All sections from 12 lbs. up to and including 45 lbs. per yard.

PIG IRON—
Machine cast FOUNDRY MALLEABLE and BASIC.

SULPHATE OF AMMONIA.
NITRE CAKE.

For the better convenience of customers who may find it necessary to secure rush shipments of particular items, they contemplate keeping a large stock of all the various standard sections constantly on hand, and to this end extensive warehouse facilities are being prepared.
Your enquiries and business will be appreciated.

ALGOMA STEEL CORPORATION

SAULT STE. MARIE, ONTARIO

Saves $69 Weekly by Using Oakite

ONE of the largest motor car plants formerly cleaned steel parts with gasoline at a cost of $95 a week.

This plant now cleans these parts with Oakite at a cost of $26 a week.

Oakite saves ($95 – $26) a week Dangers common to the use of gasoline are eliminated. Working conditions are improved. Production is increased. Time is economized.

This Advertisement is one of a series based on actual occurrences.

You can do it too.

Correspondence invited

OAKITE MANUFACTURED BY OAKLEY CHEMICAL CO. 44 THAMES STREET · NEW YORK

If interested tear out this page and place with letters to be answered.

Illustration shows a Wilt Twist Drill in active service at the new shops of the Canadian National Railway, Leaside, Ontario.

Wilt Quality improves production and cuts drilling costs to a minimum.

This is no theory, no untested statement, but an established fact backed by many of the largest manufacturers throughout Canada. For steady, reliable output of work that is satisfactory from the standpoint both of quantity and quality there is no better choice than WILT products.

"Where there's a WILT—There's the Way"

WILT TWIST DRILL COMPANY

OF CANADA, LTD. WALKERVILLE, ONT.

London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, London, E.C. 2, England.

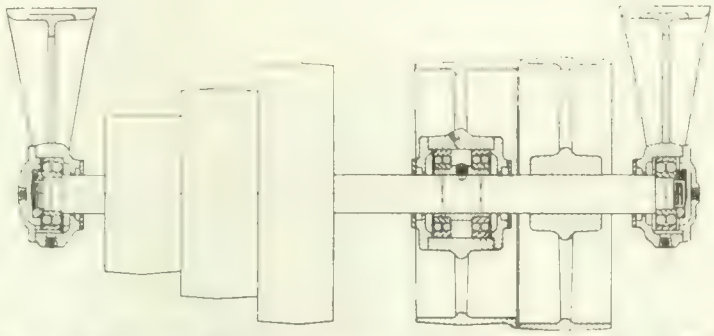
Manufacturers of a paramount line of Twist Drills, Reamers and Milling Cutters

If interested tear out this page and place with letters to be answered.

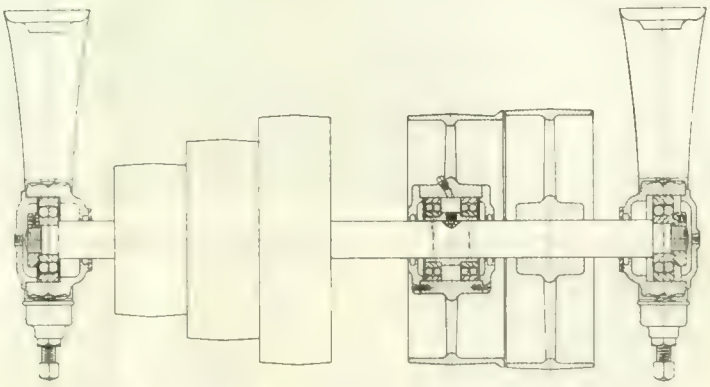
If interested tear out this page and place with letters to be answered.

Shafts

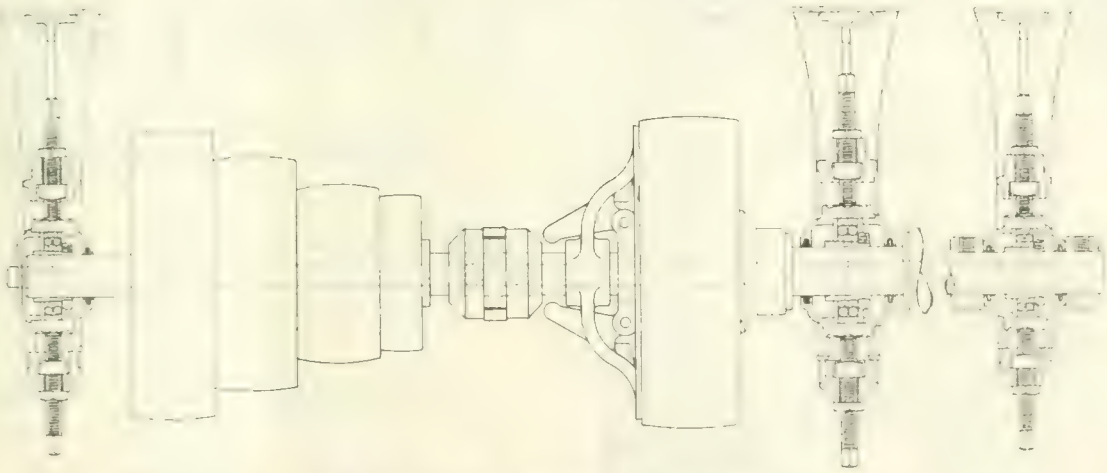
Send us your name and address so that we can put you on our mailing list for a complete set of these articles.



Rigid type hanger and standard type SKF radial bearings. The aligning feature of the SKF bearing allows the use of rigid hangers. No other bearing will give satisfaction when used with rigid type hangers.



Adjustable type hanger and standard type SKF radial bearings.

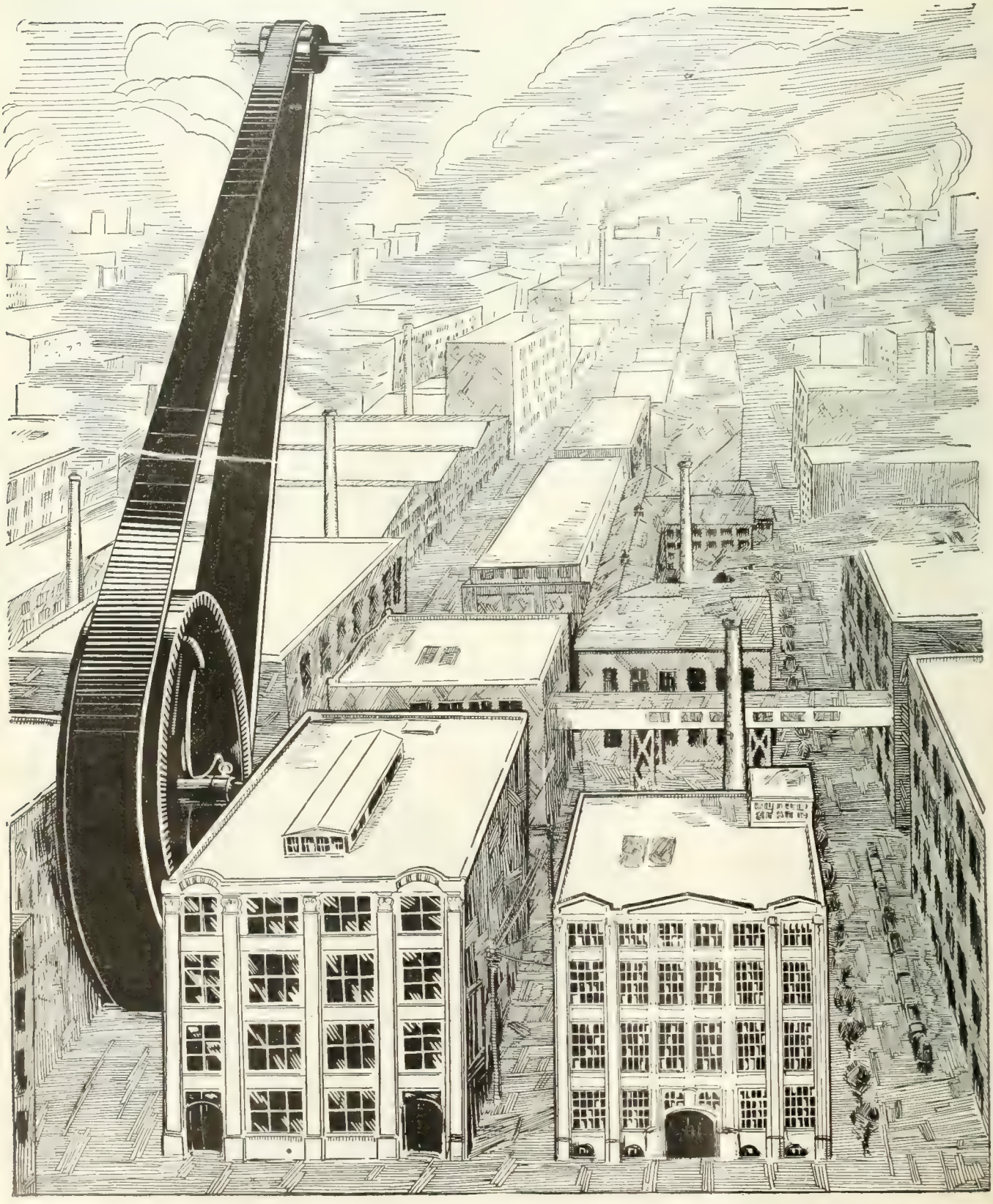


Ball bearing mounting showing SKF adapter type bearings applied to countershaft, standard type adjustable hanger casings.

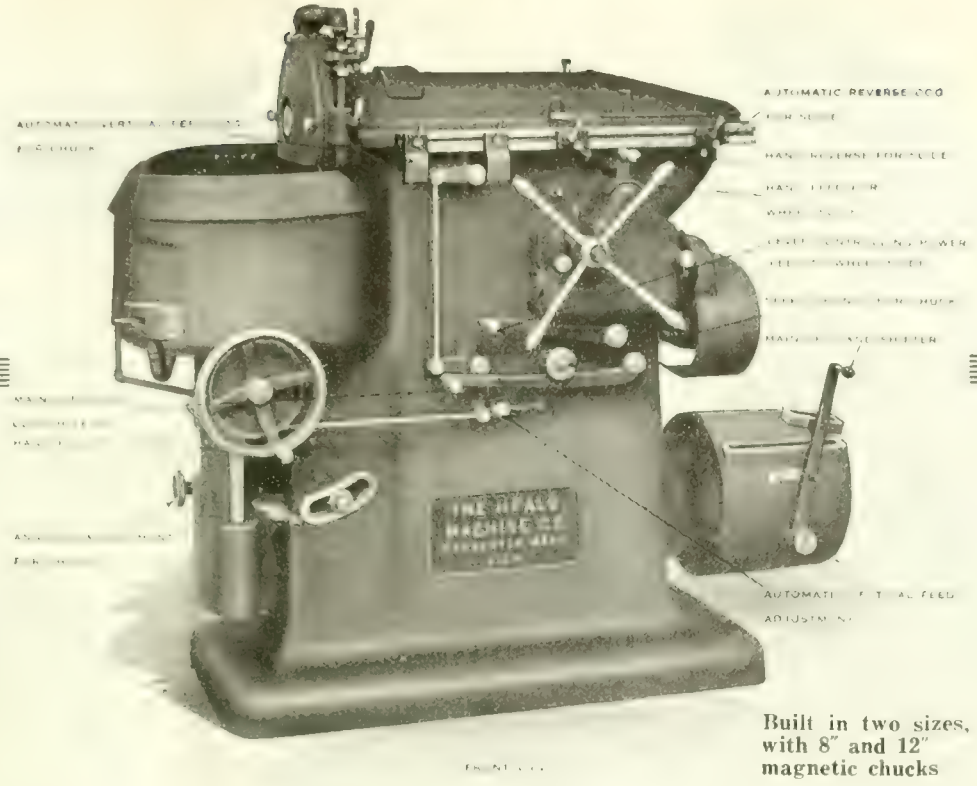
If interested tear out this page and place with letters to be advertisers listed under proper heading.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.



GRIND WITH A HEALD AND BE SURE



GRIND WITH A HEALD AND BE SURE

Built in two sizes, with 8" and 12" magnetic chucks

THE LAST WORD ON ROTARY SURFACE GRINDERS

The new HEALD No. 20 and No. 22 machine is a simple, productive and accurate rotary surface grinder. That the new machines meet the first requirements can be seen from the photograph above. In regard to production and finish, experiments have proven these new machines have no equal in the field to-day.

The WHEEL SIDE is a massive casting having a flat and "V" way insuring continued alignment. Bearing surfaces are large and well protected. Spindle belt operates with a downward pull; an important factor in rigidity.

The chrome nickel WHEEL SPINDLE is mounted in large bearings, all adjustments of which are made at grinding wheel end through an opening in top of slide.

The MAIN DRIVE UNIT receives power from the main line by tight and loose pulleys, transmitting it directly by belt to main speed box, wheel spindle and pump.

MAIN SPEED BOX, situated on the rear of machine, furnishes power to wheel slide by a 3-step cone, and operates the chuck, which has three speeds, through a bank of gears. Wheel slide and chuck are independent of each other, permitting a large latitude in speeds and feeds.

Chuck spindle is driven by spiral gears, one of which is mounted directly on the spindle. Spindle itself is mounted in a sleeve which has vertical adjustment. Upper portion rests in a taper bearing, lower end being equipped with ball bearings—wear is automatically taken up. All control levers and adjustments are within easy reach of operator.

Complete water apparatus is furnished with each machine; built in two sizes, 8 in. and 12 in., with Heald Magnetic Chucks are regular equipment. Motor drive if desired.

May We Send You Literature?

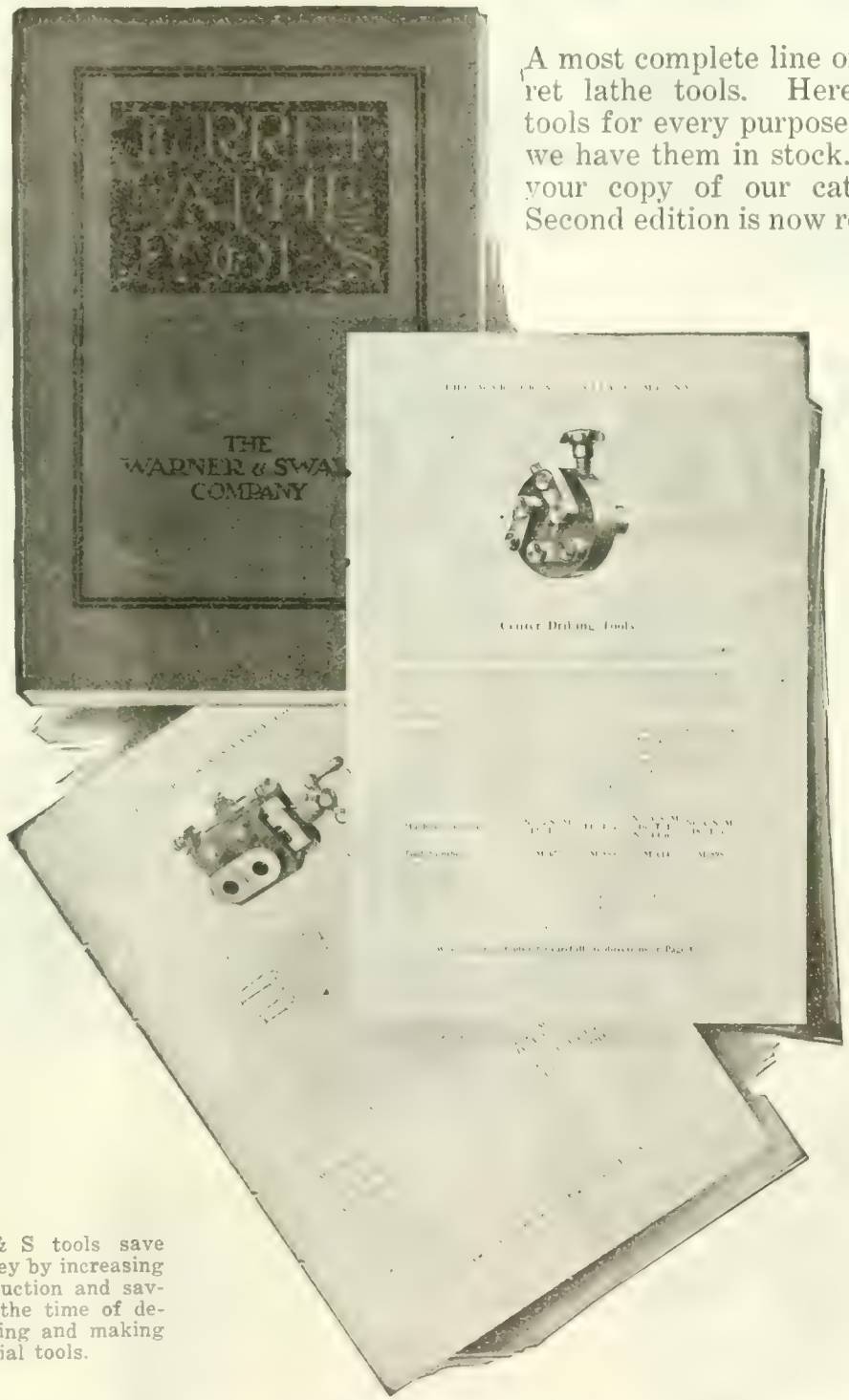
THE HEALD MACHINE COMPANY
WORCESTER, MASS.

BRANCH OFFICES: New York, 839 Singer Bldg., Philadelphia, 1308 Commonwealth Bldg. Chicago, 20 South Jefferson St. Detroit, 401 Marquette Bldg. Cincinnati, 311 Provident Bank Bldg. Cleveland, 721 Engineers Bldg. Western Agents: Eccles & Smith Co., Los Angeles, San Francisco and Portland. Salt Lake Hardware Co., Utah and Idaho.
FOREIGN AGENTS: Alfred Herbert, Ltd., England. Societe Anonyme, Alfred Herbert, France, Switzerland. Societa Anonima Italiana, Alfred Herbert, Italy. F. W. Horne Co., Japan. Wilh Sonesson & Co., Sweden, Denmark and Norway. Henri Benedictus, Brussels, Belgium. American Machinery Syndicate, Spain and Portugal.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

Get Your Copy



A most complete line of turret lathe tools. Here are tools for every purpose, and we have them in stock. Get your copy of our catalog. Second edition is now ready.

W & S tools save money by increasing production and saving the time of designing and making special tools.

THE WARNER & SWASEY COMPANY

CLEVELAND, OHIO, U.S.A.

New York Office Singer Bldg. **Boston Office**—Oliver Bldg. **Buffalo Office** Iroquois Bldg.
Detroit Office Ford Bldg. **Chicago Office and Show Rooms** 618-622 Washington Blvd.

FOREIGN AGENTS: Chas. Churchill & Co., Ltd., London, Birmingham, Manchester, Newcastle-on-Tyne and Glasgow. Allied Machinery Company, Paris and Turin. Benson Brothers, Sydney and Melbourne. A. Asher Smith, Sydney. A. R. Williams Machinery Co., Ltd., Toronto, St. John, Winnipeg and Vancouver. Williams & Wilson, Ltd., Montreal.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

Double Production

Another Competitive Record for

DAVIDSONIZED
High Speed Steel Tools

Here are the facts which speak for themselves. The name of the plant in which the record was made, will be furnished on request.

Four straddle mills on arbor, size 6 inches by ½ inch
Material: High Manganese steel forgings.

Operation: On one machine using cutters of a standard make (not Davidsonized).

2 minutes, 40 seconds

On adjoining machine, using Davidsonized Cutters of same size and type, on the same operation

1 minute, 5 seconds

A clear case of **more than 100% increase** in production speed through the use of Davidsonized High Speed Steel Cutters.

Furthermore, the Davidsonized Cutters, even at the increased speed, stood up to the work as many hours as the others. Thus, the increase in number of pieces per grinding was also in excess of 100%.

Tool costs, labor costs and overhead per piece produced, all come down in the same proportion.

Through record after record of this unquestionable sort, Davidsonized Tools are being adopted by more and more of the country's foremost plants. Can **you** afford to wait longer before trying them out?

THE DAVIDSON TOOL MFG. CORPORATION

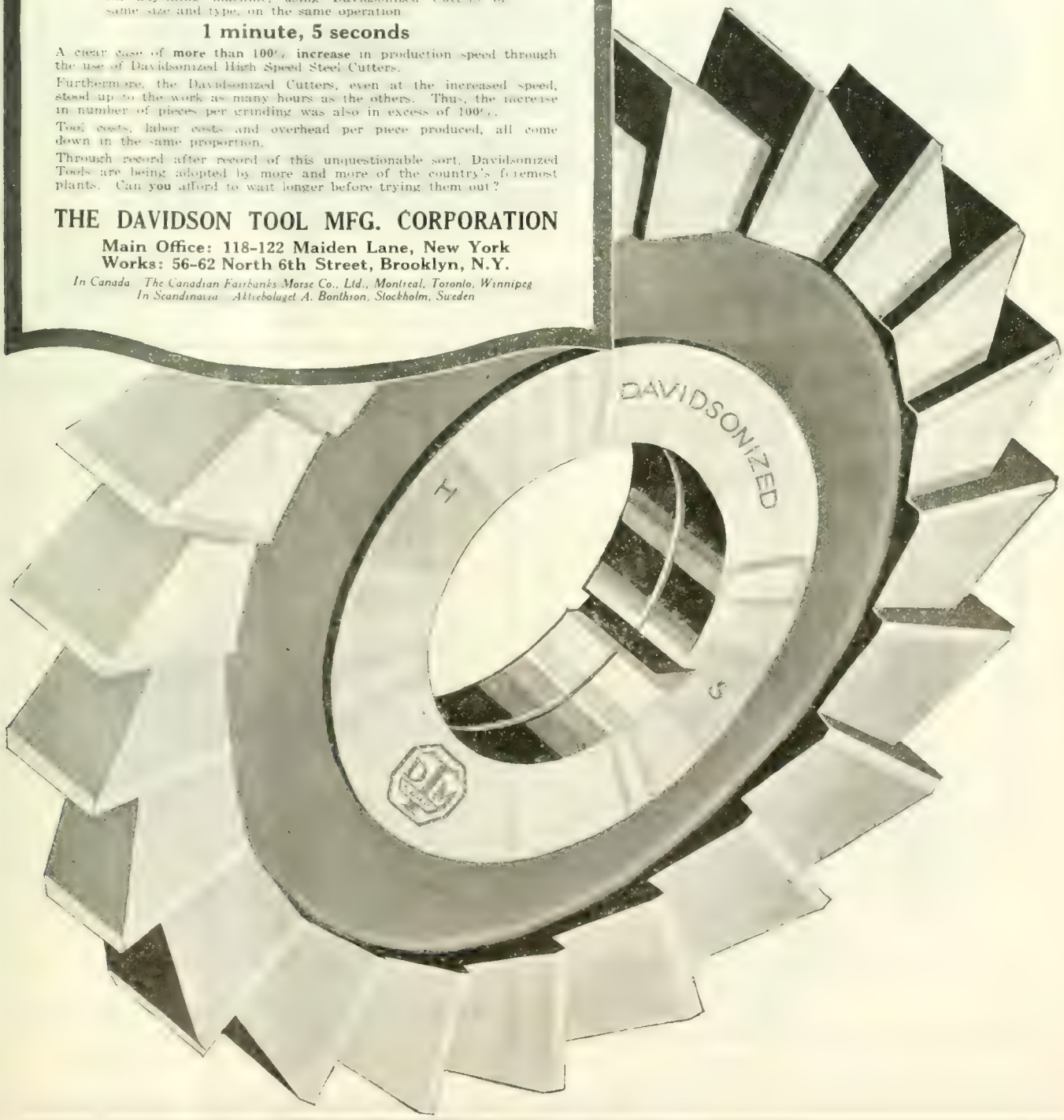
Main Office: 118-122 Maiden Lane, New York
Works: 56-62 North 6th Street, Brooklyn, N.Y.

In Canada The Canadian Fairbanks Morse Co., Ltd., Montreal, Toronto, Winnipeg
In Scandinavia Aktiebolaget A. Bonthron, Stockholm, Sweden

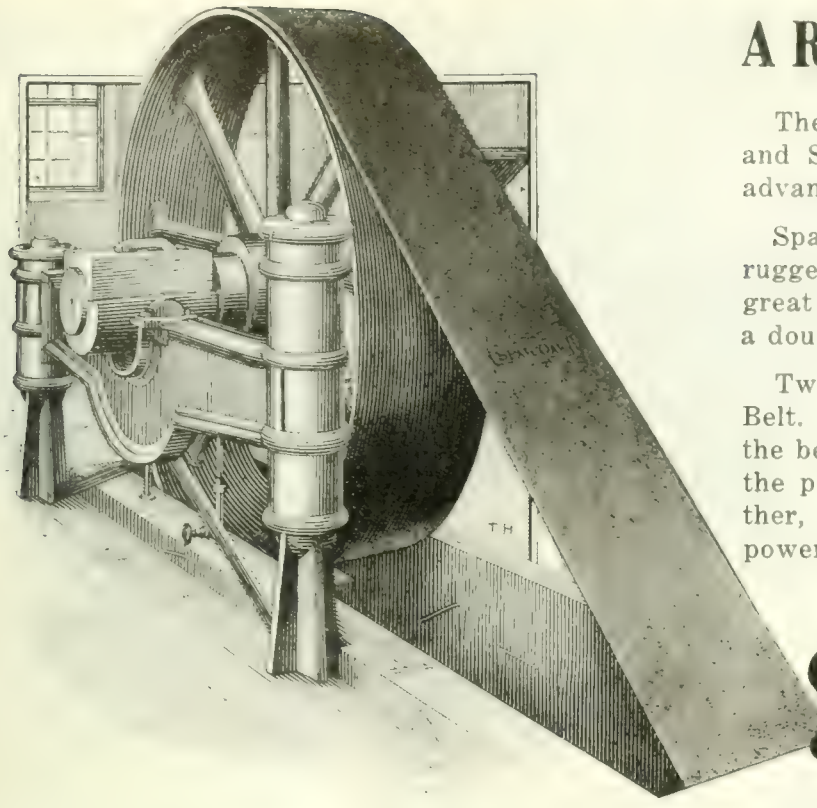
Special Service

To Concerns Who Make Their Own Tools

We will supply Davidsonized High Speed Steel Blanks, semi-finished to within approximately .015 to .020, either soft annealed or hardened.



If interested tear out this page and place with letters to be answered.



A Rugged Pulley-Gripper

There is nothing like leather for belting, and SparOak Leather Belting has peculiar advantages all its own.

SparOak is a two-in-one belt combining rugged strength with unique pulley-grip. Its great endurance and minimized slip make it a double-service belt of unusual qualities.

Two kinds of leather enter into a SparOak Belt. The outer ply is oak tanned, cut from the best selected center stock. The ply next the pulley is Graton & Knight Spartan leather, tanned to give pliability and traction power unequalled by any other material.

SparOak Belting

Here is an 18" SparOak Belt on a hard drive in a warm, moist atmosphere where the extreme flexibility of Spartan and the firmness of Oak leather are necessary.

SparOak is the answer to a great many perplexing belt problems, saving power and standing up under the most severe conditions.

If you have a troublesome belt drive, consult us as to what belt is required. Maybe it is SparOak, but in any event one of the Graton & Knight Standardized Series of Belts will fit exactly. Write for our booklet on Standardized Belting.

SparkOak Belts grip from the start. During the weeks most new belts take to "work in," a SparOak Belt is giving full power and keeping production up to normal. And SparOak Belts keep on gripping for years under adverse conditions. They withstand repeated shifting, and the wear against step cone or flange pulleys. They render efficient service on drives with high speeds, small pulleys, and heavy loads. In short, any of the factors that quickly wear out ordinary belts affect SparOak belting amazingly little.

CANADIAN GRATON & KNIGHT, LTD.

Montreal, Canada

Canadian Representatives: The Canadian Fairbanks-Morse Co., Ltd., St. John, Montreal, Ottawa, Toronto, Hamilton, Quebec, Calgary, Saskatoon, Vancouver, Windsor, Winnipeg, Victoria

Graton & Knight

Standardized Series

MADE IN CANADA

Leather Belting

MADE IN CANADA

Tanned by us for belting use

If interested tear out this page and place with letters to be answered.

CANADIAN MACHINERY
AND
MANUFACTURING NEWS

Vol. XXI. No. 13. October 2, 1919

Making the "Hall" Line of Pipe Machinery

Four Brothers With One Aim, Namely, to Turn Out the Best Line of Pipe Machinery Possible.

By J. H. MOORE, Associate Editor
Canadian Machinery

A Brantford Industry Which Has Shown Remarkable Growth and Progress in Recent Years.

TO get properly enthusiastic over anything, you must first get cause for that feeling of enthusiasm. Nothing creates such a feeling quicker than a like enthusiasm on the part of the person, or persons, describing some particular operation or system of manufacture, which brings the writer up to the point where he will describe his visit to the plant of John H. Hall and Sons, Limited, Brantford, Ontario.

The moment he entered the plant he was struck with the earnest spirit of enthusiasm pervading the atmosphere. Here was a plant manufacturing a product which it not only thoroughly believed in, but was willing to guarantee to the limit. "When we send goods out of the shop, we do not by any means consider that the end of it," commented Mr. L. S. Hall, "but rather the starting point of our interest, for we have been, and are even more so than ever, following out the policy to check up closely the career, as it were, of our machines. We watch and inquire carefully into how they please, and stand up to their work, and I am glad to say," he concluded, "that the results are very gratifying."

Before going into the methods of this firm any further, it might not be amiss to give readers a short history of this concern, how it started, and its war-time record.

How It Started

The start was made as far back as seventeen years ago, in the same place, namely, Brantford, Ontario. At that time, J. H. Hall, the founder of the concern, was president and general manager, and together with his four sons, L. S., E. W., E. L. and A. R. Hall, respectively, he launched out as a manufacturer of special machinery. Screw cutting machines for the John Morrow Co., were amongst their first orders, and also special pipe machines for the Page Hersey Co; pipe benders, straighteners, etc., were also manufactured during this period. The idea, however, kept to the fore was the developing of their line of pipe machinery, improving this in every way possible, in order to keep not only abreast of the times, but ahead of them.

When war broke out, there commenced an enormous demand for cutting off machines. This firm stepped into the breach, and made certain changes to their pipe machines which turned them into at least a good temporary cut-off machine. But the demand for a special machine grew so insistent that work was commenced on designing one. A point worthy of note, is the fact that they do their own designing; Mr. L. S. Hall being the brother with the designing qualifications.

He promptly got to work with the result that a special rugged machine, equipped with ball thrusts, friction clutch and air chuck, was soon on the market, and in great demand. During last year over a quarter of a million dollars' worth of business was handled by this concern. From the start of war 1,400 machines were sent out, and in many cases exported, one case in point being the sending of a 12 in. machine expressed to Moscow in Russia, during the submarine scare. This is about the only case where the Hall Brothers admit, they haven't followed up the career of their machine. A notable feature showing speed which was exhibited, is as follows: that three weeks after the placing of the first order, the first machine was shipped.

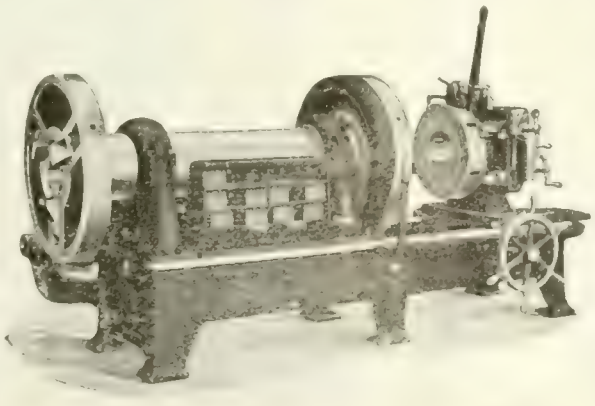


FIG. 1 THE MACHINE AS IT IS NOW BUILT.

But to continue a little more on the personnel of the firm. The father, John H. Hall, who established the business in 1902, lived to see the concern grow to splendid proportions, but passed away suddenly in Los Angeles, a short tim ago, at the age of 67, leaving the business in the hands of his sons, who had so splendidly helped the good work along. It might be well to add that three of these sons are all practical mechanics,

the other being the business spoke in the wheel. Speaking of wheel, gives us an excellent opportunity to show this firm's novel trade-mark, which was designed by L. S. Hall himself.

In each of the spokes is placed a photograph of the brothers, together with the founder of the business. The novelty of this trade mark alone defies its being copied. At the death of J. H. Hall, a shake-up was made in the positions, and following is present duty of individuals mentioned: Mr. L. S. Hall, president and general manager; Mr. E. W. Hall, secretary and treasurer; Mr. E. L. Hall, director; Mr. A. R. Hall, vice-president; Mr. E. L. Williams, office manager and director.

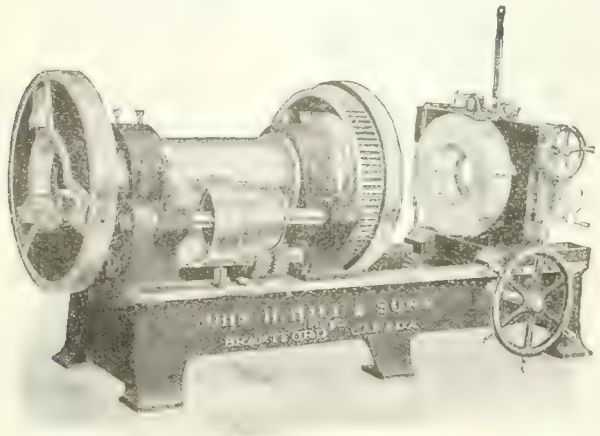


FIG. 2 - THE MACHINE AS IT USED TO BE BUILT. (NOTE THE DIFFERENCE AND READ THE TEXT.)

The Actual Manufacture

So now since having placed before readers the inside history, as it were, let us proceed to consider the actual manufacture of their line of pipe machinery.

Pipe lathes, rapid nipple machines, rapid upright roller pipe cutters and special machinery for the tube mills about cover their regular line, but we will chiefly interest ourselves in their pipe threading lathes. Those machines are made in various sizes, from the hand machines up to the enormous capacity of 18-inch pipe. Two of these huge machines are at present under construction.

Their smallest power machine has a capacity up to 2 inch, while they next range as follows: No. 4 Simplex, No. 4 Standard Improved, No. 6 Standard Improved, No. 6 Duplex Improved, No. 8 ditto, Nos. 10 and 12, ditto. Then, of course, comes any larger size desired, such as 16-inch, 18-inch, etc. To go over all their lines in detail would be impossible, but one thing that impressed the writer was the compactness, yet absolute rigidity of these machines. All gear changing levers are within easy reach of the operator, and driving pulley is entirely out of his way.

Perhaps the best way to point out what the writer refers to, would be to compare Figs. 1 and 2. At Fig. 1 we see the machine as this firm used to build it. Note: the driving pulley and gears all exposed, and very much in the way. But now, refer to Fig. 2 and see the difference.

A Comparison

Where before, the cone pulley and gears stood in the way, we find these placed entirely out of the way. In their place is a convenient cabinet for storing the dies used on the machine. The advantage of such a cabinet is self-apparent. There is also a small pocket cast on the side of this cabinet to hold orders, etc., that the operator might need to refer to. In other words the operator is considered at all times in the design.

The gears are also totally enclosed, and run in oil, which is a great improvement over the former method.

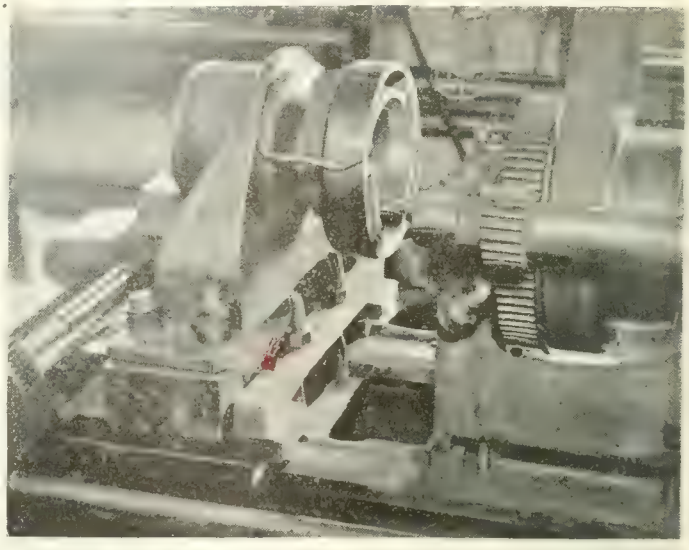


FIG. 4—MILLING THE CAMS ON THE DIE HEADS.

The lever operating these gear changes come out as shown on photo, within easy reach of the operator, and all the different changes obtainable are plainly marked, in order that the operator cannot get confused. A single drive pulley is placed at the back of the machine, on a special drive shaft. A friction clutch is also installed in connection with this pulley. Such a scheme allows the operator to turn the spindle head around a very short distance when desired. A feature such as this needs no coment to impress readers with its benefits, for the lack of this feature has been a serious drawback so far.

There is also a rotary gear pump on the rear of machine. This pump is re-

FIG. 3.—PLANING THE BED OF A DUPLEX PIPE LATHE.

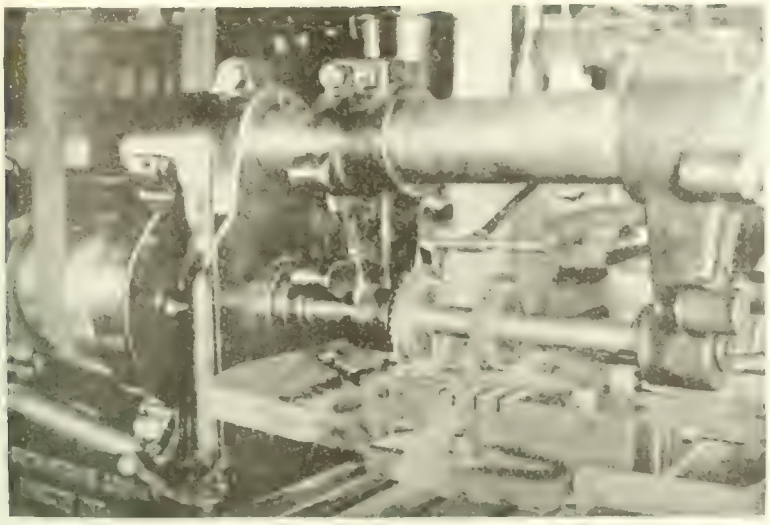


FIG. 5 MILLING THE DIE BLANKS WITH A FORD-SMITH MILLER

versible, so, of course, it does not matter whether you are cutting right, or left hand threads, the pump will work equally well.

All spindles are self oiling, and the main spindle bearings are oiled from a chain which runs at all times in a well of oil. This feature is obtained through the design of the bearing and caps, which have a hollow core to accommodate the oil and chain. Interchangeable bronze nuts are furnished in all jaws of machine.

Micrometer adjustment is arranged for in the die head, also a special arrangement for centering the pipe. There is also a cut-off tool, and reaming tool, in connection with the die head on the large size machines.

To enumerate all the points of design would occupy too much time and space, suffice it to say that each point throughout these machines has been carefully thought out, and designed with the idea in mind to make them as far as possible in a class by themselves.

Of course, as the reader will understand, these machines can be fitted up with motor drive, in fact, in many cases, this is done and the machine is designed with this idea in mind. To place a motor on these machines is not a case of afterthought, for there is a pad, and special bracket, so arranged that when desired this method is installed.

It might be well at this point to show by illustration some of the operations on these machines.

Planing the Bed

At Fig. 3 we see a bed for one of their duplex pipe lathes being planed. There are a few points to which the writer would call your attention. Note how the bearings for the gear box are all self-contained in this bed. Directly below these bearings there is a trough, which holds the oil in which the gears run. Another feature is the trough shown on the side of the bed. This trough or tray catches all the oil drips, which would have a tendency to run down the side of bed, giving it a sloppy appearance. By means of this tray the machine is always kept looking neat and clean. One other point in connection with this bed, is the fact that all points slope toward the centre, that is, such points where oil would strike. In this way the oil all runs to the centre of machine, and later passes through two drain holes, with strainer attached. In this way the same oil can be used over and over again, yet is always clean and free from cuttings.

The other points of interest in this photograph can easily be ascertained by a study of the photo.

Milling the Cams on Head

Another of interest is shown at view at Fig. 4. Here is a novel fixture designed to mill, on the lathe, the die

FIG. 6 HOBBING A SET OF DIES ON SPECIAL FITTED LATHE

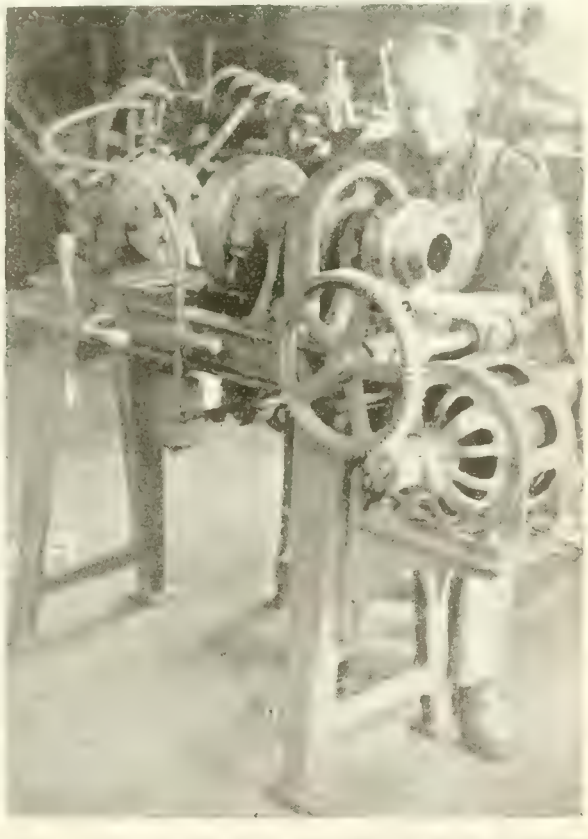


FIG. 7 ASSEMBLING A SMALL MOTOR-DRIVEN MACHINE.

heads, which have three, four or six peculiar shaped cams, as the case may be, on their face. The one illustrated has three such cam shapes. This lathe has been specially rigged up to take all sizes of these heads, and is fitted with worm drive at back, connected to the saddle. Of course, this feeds the saddle crosswise at a certain speed, depending on the cutter, and cam being machined. Different plates are placed on master cams, to suit conditions. High speed cutters are used and one operator runs three machines. Readers can, by studying this picture, follow further its various details.

In Fig. 5 we see a Ford-Smith miller busy at work on die blanks for these machines. Four cutters are used, two slitting and two lipping cutters; of course, the two lipping cutters mill the lip on the die blank, while the slitting cutter cuts them off.

Hobbing the Dies

Fig. 6 shows the operator at work on the hobbing out of a set of dies. This operation is a very important one, and is performed in a very creditable manner.

The die blanks are placed in a specially constructed jig as shown, and a special saddle has been constructed to hold the milling cutter, which is made of first-class high speed steel.

The driving mechanism for the head is also special, being a worm drive to reduce the head speed to suit. These dies are now cut with special care, for after all is said and done, the dies are the main portion of the machine. Pure lard oil is used, and the dies are hobbed at a very slow speed to ensure absolute accuracy. Approximately 6 hours is occupied in the cutting of a set of dies.

Readers will notice that this machine is also a lathe converted for this special purpose.

The hardening of the dies is also an interesting study. A special chart has been made, based on what has been found best for each particular purpose, and this is strictly adhered to. Pyrometer, etc., etc., form a part of this hardening department.

At Fig. 7 we see a smaller machine with motor drive attachment being assembled. Readers can readily grasp the compactness and general appearance of this machine from the photograph.

Throughout this article the writer has endeavored to emphasize the fact that the work on these machines is carried out with extreme care, and before going on to the next portion of this article it will be well to lay stress upon the fact that no work is passed through the shop except perfect in every detail.

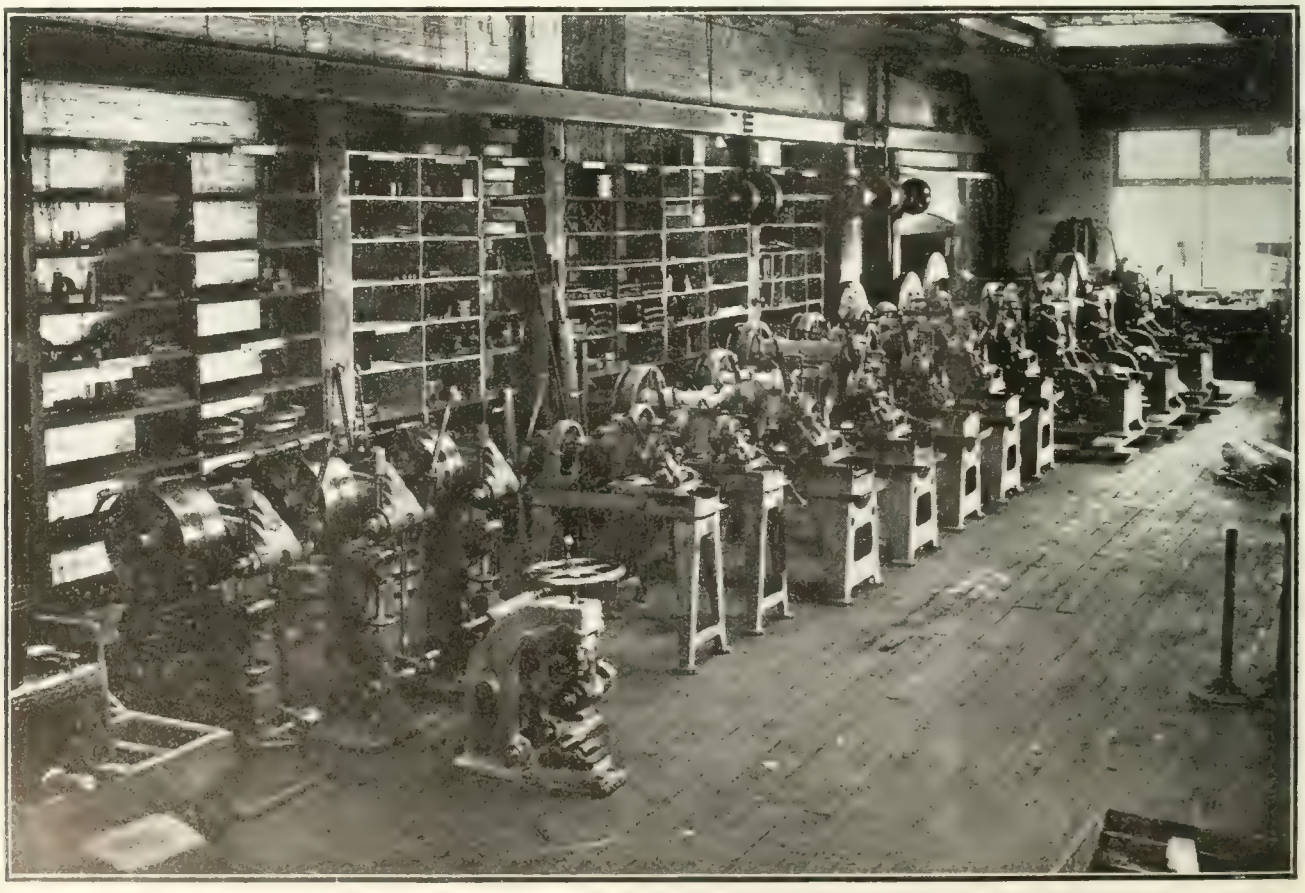
And now a word as to the service schemes instituted by this firm.

As stated before, they do not consider their obligations ended by the sale of a machine, but they follow up its subsequent performance. They know that the die problem is a large one, in fact, that it is the main problem, and so to cope with this as far as possible they have issued a bulletin entitled: "How do your dies die"? In this pamphlet, with such a novel heading, they go on to describe first—questions you should ask yourself—for instance: "What production am I getting from my dies?" etc., etc. All these questions are real practical ones, met with every day. They then show photographs of dies improperly ground and show why you cannot get results from such dies. They last of all tell you how to secure the maximum production and make up a chart, strictly for the man on the machine to work from.

They also issue a chart, showing every part of their machine, so that anyone can easily get familiar with all parts. Numerous other service bulletins are on the way, and as Mr. L. S. Hall told the writer, "our aim is to make our service practical and worth while."

Perhaps the best method of concluding an article of this nature would be to quote a little statement, made by L. S. Hall himself, which he mentioned in an offhand way to the writer. "I have always had a pet hobby," he said, "to feel that whatever I designed was a stop above any former effort, and I also felt that a business, to succeed, must not only give the customer all that he expects, but a little more.

It is this policy that is making them feel cramped in their present quarters in spite of the addition made to their plant during wartime, and it's a safe bet that there will soon be another addition added if the present policy of this company continues, as it will, of course, so long as the present executives hold office.



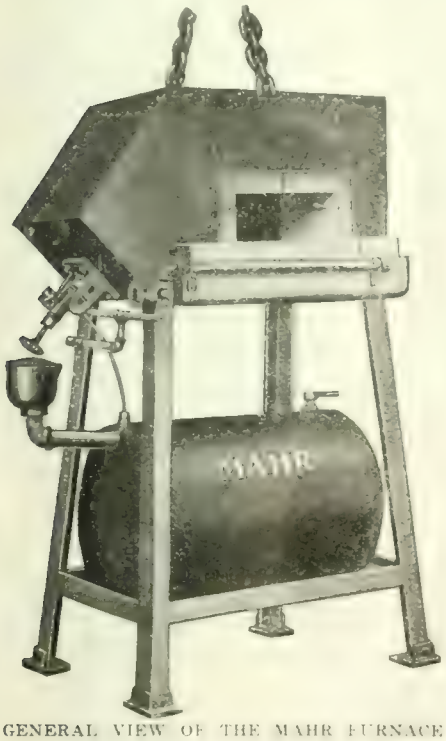
A GENERAL VIEW OF MACHINES HELD IN THE SHOP FOR EXHIBITION AT THE RECENT C. A. S. E. CONVENTION AT BRANTFORD.

Description of a Mahr Calorizor and Furnace

Oil Burning Furnaces For Forging and Heat Treating Purposes Are Rapidly Becoming the Usual Installation in the Industrial Plant of To-day. This Describes One Such Furnace

By J. H. RODGERS, Associate Editor Canadian Machinery

THE oil-burning furnace, for forging and heat treating purposes, is rapidly becoming a very essential feature of present industrial enterprise. The necessity of scientific application of heat in the treatment of shell forgings, to conform to definite specifications relative to the manufacture of munitions, has demonstrated the advantages that could be derived from a better knowledge of this branch of engineering practice. The acceleration of efficiency in the construction of furnaces during

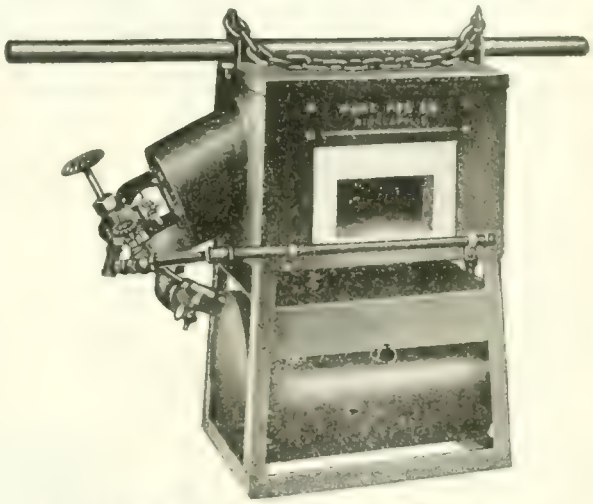


GENERAL VIEW OF THE MAHR FURNACE

the war, was amply illustrated in the improved designs that were in successful operation at the close of active shell production. Experience, coupled with the study that has since been given to this all important unit, the oil-fired furnace, has enabled engineers to make further progress along these lines, and faulty design is gradually being eliminated and being replaced by improvements that will eventually establish the extreme economic value of this particular type of furnace.

In many styles of furnaces the actual heating chamber, in which the parts are subjected to the heat treatment, is likewise utilized as the combustion chamber, and the inevitable presence of oxygen necessary for combustion, invariably results in oxidizing the metal in the furnace. This has always been a serious factor in the process of heat treatment of steel or other metals, and unless extreme care is exercised, the resultant effect of oxidization is frequently costly and inconvenient.

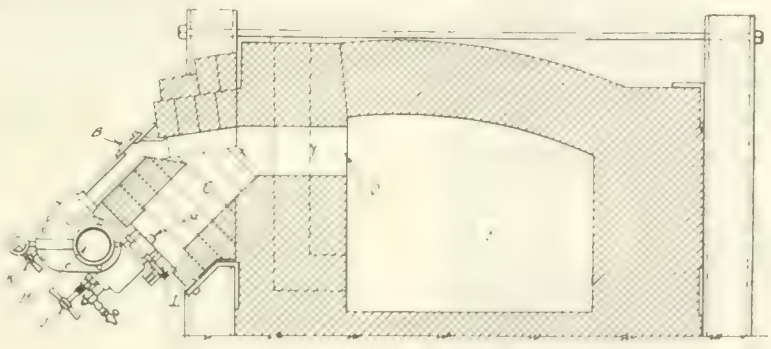
Realizing that a high efficiency furnace must be one in which the oxygen in the fuel mixture would be entirely consumed before coming in contact with the work in the furnace, the Mahr Manufacturing Co. of Minneapolis, Minn., have perfected a design of furnace in which the above requirements have been met. Apart from the method of carrying off the waste gases, the general design of the furnace proper differs little from those of other makes, but it is the design and construction of the burner and the combustion chamber that gives to the furnace its individuality and economic value.



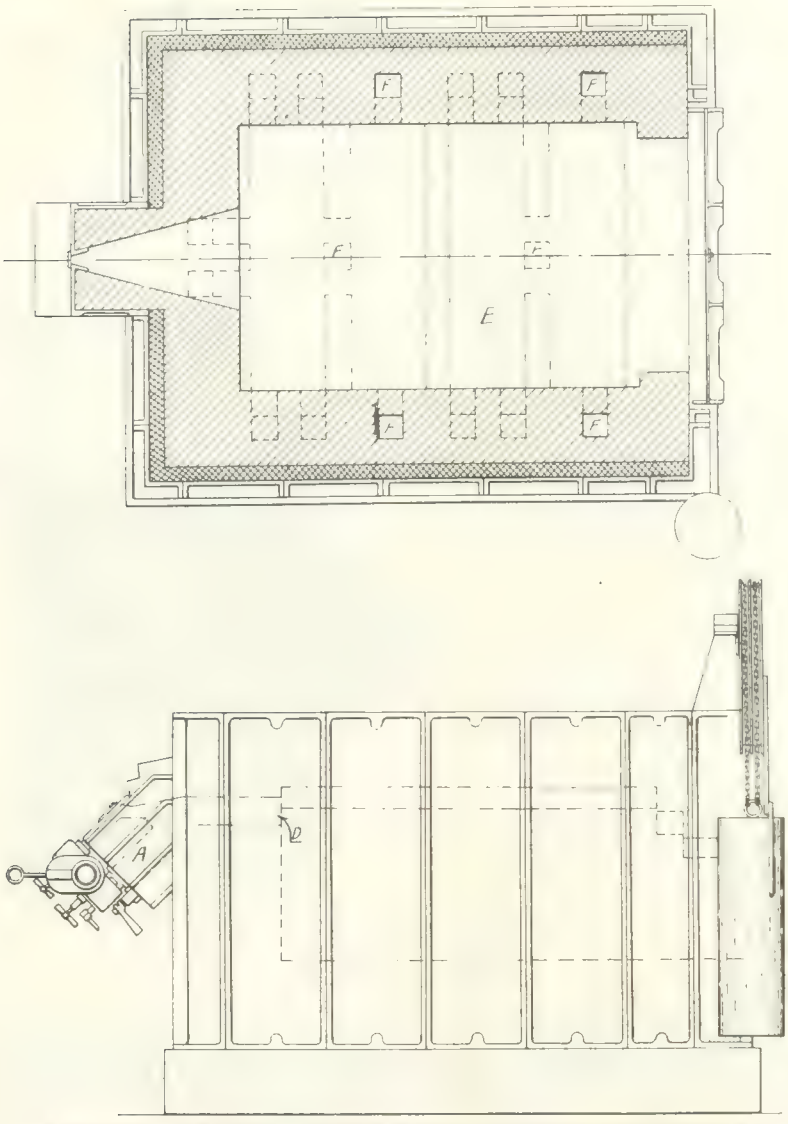
A TYPE OF FURNACE OF LOWER CONSTRUCTION

It will be seen from the illustrations that the calorizor A is attached to the outside wall of the furnace in such a position that the opening D into the furnace is located near the roof of the heating chamber E. This permits of a swirling movement of the gases as they distribute to all sections of the heating chamber. Even after the gases have done their initial work, the surplus heat is still further utilized by a special arrangement of the outlet flues F, F, etc., as these circle the fire chamber, through the brickwork, before passing to the atmosphere—a decided improvement over the old method, where the waste gases passed directly through the roof.

A brief description of the action of the calorizor may be given as follows: The oil enters the combustion chamber through the oil nozzle G, and is atomized by the main air supply entering at H and passing into the combustion chamber around the oil nozzle. The atomized oil, having been lighted through the lighting hole I, receives a further supply of air through the lower air valve J. The effect of the due adjustment of these valves is to carry the flaming gas up to the point X, where it is met with an additional supply of air entering through the upper air valve K, this second current of air completing the combustion at the point approximately marked Y, at the same time giving the hot gases, so produced, the necessary velocity to carry them across, and circulate through the heat chamber. In the lower duct, between the oil nozzle G and the point X, the atomization and the combustion should be carried well forward, but the supply of air should not be so great as to draw the flame entirely away from the lighting hole pocket. The peep hole is shown at

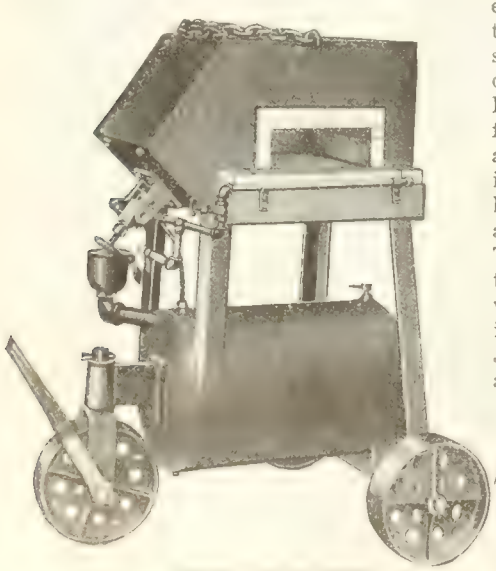


SECTIONAL VIEW THROUGH THE FURNACE



PLAN AND ELEVATION OF THE MAHR CALORIYOR AND FURNACE

B. If the above directions are closely adhered to it is claimed that but a short tongue of flame, at most, will find its way into the heating chamber, and the gases therein will be so free of oxygen that no oxidization of the metal will take place. The even distribution of the heat is aided by the fan-shaped calorizor duct, where it enters the furnace. The action of the calorizor is similar to that of the carburetor on an automobile, where the latter is fitted with independent air valves. For satisfactory operation of these calorizors it is only necessary to have an air pressure of about 8 ounces, supplied by means of a blower. In general, the Maar calorizors are uniform in size, but in the smaller furnaces and portable forges the calorizor is built into the furnace frame, while for the large furnaces the calorizor is a separate unit and can be located as desired. These furnaces are made in various types and sizes, including rivet, flue welding, forging, annealing and hardening types of every description. The James Buckley Company, of Montreal, are the exclusive Canadian agents.



A PORTABLE OUTFIT

AN IMPORTANT AFFILIATION

THE National Safety Council announces an affiliation with the University of Cincinnati for the purpose of carrying out a program that is unique—almost radical—both to the fields of education and accident prevention, and that opens a new and promising avenue for the service of the council.

Briefly, this program includes the establishment of an industrial medicine division at the University of Cincinnati, where medical students and graduate physicians will be given special training not only in industrial medicine, but in industrial relations, including sanitation and all the fundamentals of safety work as well. This school, which is already under way, is unusal in many respects, chief among which are the following:

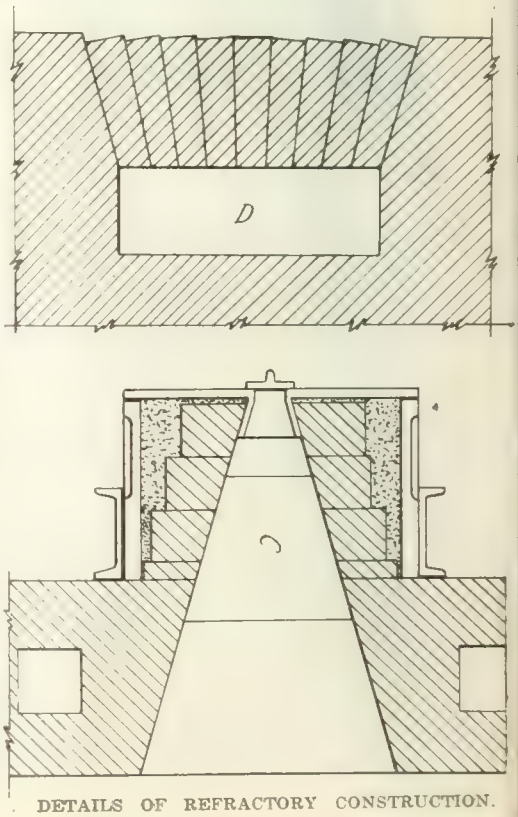
1. The student physicians alternately spend part of their time in school and and part in the field among the industries of Cincinnati, Dayton and other Ohio cities, receiving actual experience in the work for which they are being prepared;

2. The enterprise was conceived by, and is being financed by the industrial leaders of Cincinnati and the vicinity, who have guaranteed a fund of about $40,000 annually for five years;

3. In addition to the regular courses special courses will be given in such subjects as: (a) the medical, industrial and safety problems arising from the coming of women industry; (b) public health, and (c) hospital management;

4. The facilities of the school include an industrial research laboratory where physical conditions menacing the health of employees arising in industry will be brought up for investigation and solution. How can dust be eliminated in a certain plant? Is this gas injurious? How can the lighting problems of a peculiarly arranged factory be solved? These and all similar problems arising among the industries represented among

Continued on page 351



DETAILS OF REFRACTORY CONSTRUCTION.

Nichrome Castings for Heat Treatment

The Subject of Proper Material For Heat Treating Receptacles is a Vital One and Herein Are Described Points of Merit in the Properties of Nichrome For Such Use

By HARRISON JENKINS

IN heat treating processes such as annealing, carbonizing, hardening and tempering, there is a demand for containers or receptacles made of metals or alloys which will maintain their strength and durability at high temperatures. Such receptacles undergo repeated cooling and heating from 1,500° F. to 1,850° F. and in order to avoid costly maintenance due to additional expense for labor, fuel, material and constant replacement, the heat treating containers must not be subject to cracking, changing in form, forming a surface scale or warping. Where the walls of annealing boxes, carbonizing boxes, etc., increase in thickness due to growing, or form a hard surface scale, relatively more time is required for the completion of the heat-treating process. In this case it takes longer for the heat to penetrate into the work. Where the physical strength of the material is comparatively small, it is necessary to increase the dimensions and weight of the receptacle to such an extent as to make handling difficult and to require considerable labor. The walls of heat treating containers are preferably to be made thin as possible in order to facilitate the greatest heat penetration.

Strength of Materials at Low and High Temperatures

Although many metals and alloys have almost any required physical properties at ordinary temperatures, still all undergo a reduction in strength, change of form or scaling of the exposed surface at high temperatures.

There is a destructive reduction in the physical strength of cast iron, cast steel, structural steel, and wrought iron, and other ferrous materials when subjected to relatively high temperatures. Athough in one set of experiments, structural steel at 400° F. showed an increase of 32 per cent. of it normal strength of 70° F. and similarly wrought iron at 570° F. had a 16 per cent. greater strength than its normal strength at 70° F., nevertheless both of these materials had a tensile strength at 1,500° F. less than 18 per cent. of their normal strength at 70° F. At 1,100° F. cast iron had lost 42 per cent. of its normal strength at 70° F. and copper and bronze showed reduction in strength at as low a temperature as 200° F. The figures given would be, in general, subject to variation because of differences in the composition of materials of this class. Nevertheless, they are examples of the destructive effects mentioned above.

When cast iron is repeatedly heated to 1,700° F. it undergoes a change in size, which is generally known as "growth," always accompanied by an increase in weight, equivalent to approximately 7 or 8 per cent., which is due to the absorption of gases in the formation of oxide.

At high temperatures the oxidation of the heated metal causes a scale to be formed on the surface of cast steel and wrought iron containers, which usually reduces the size of the pot upon repeated heating, as in the case of annealing and case-hardening processes where the original scale cracks off, thereby exposing a fresh surface, which again scales.

FIG. 1—TUBES OF CAST NICHROME.

Properties of Nichrome

The injurious effects referred to are claimed to be avoided in many cases by the use of a nickel chromium alloy known as "Nichrome." This alloy made by the Driver-Harris Company, Harrison, N.J., is composed of about 60 per cent. nickel, and the remainder principally chromium. It is melted in an electric furnace, and is cast in various shapes and in any weight up to 5,000 lbs. Nichrome is already well-known since it has been used for some time in the manufacture of resistance coils and elements, for electrical heating apparatus and rheostats. The surface of nichrome boxes and containers does not oxidize at high temperatures, except in oxidizing atmospheres when a thin film of the oxide is formed, which is extremely strong and durable. This oxide film resists the action of alkalies and of such acids as sulphuric and hydrochloric. It is non-flaking and affords additional protection against corrosion or further oxidation.

Unlike iron or steel, nichrome is said to show no growth or appreciable change of form, as a result of alternate heating and cooling.

It will bend considerably before breaking, even when red or white hot. This quality may be demonstrated by heating to a red heat a plate of nichrome ¾ in. thick, and then striking it with a 20 lb. sledge upon the unsupported centre of the plate. The result is a very gradual bending.

The tensile strength of cast nichrome at 1,500° F. is approximately 24,500 lb. per sq. in., or about 30 per cent. greater than the tensile strength of cast iron at 70° F. When cold, nichrome has a tensile strength of about 50,000 to 55,000 lb. per sq. in. It softens at about 2,500° F., and melts at approximately 2,750° F.

For heat treatment, cast nichrome is adapted for annealing and carbonizing boxes, heating retorts of various kinds, cyanide hardening pots, lead tempering pots, etc.

Some of the most useful applications of this alloy will be mentioned to illustrate the possibilities of cast nichrome as a substitute for other materials, in order to avoid cracking, growing, scaling, warping, change of form, corrosion or reduction of strength.

Nichrome castings are used extensively for annealing and carbonizing boxes. (See Fig. 1). They are much more durable than boxes made of cast steel. Whereas a steel box must be made quite thick in order to withstand reduction of thickness caused by scaling or oxidation, nichrome containers can be made thin and correspondingly light. Thus, efficient heat conduction is insured, at the same time maintaining sufficient strength. The durability of ferrous boxes is limited to approximately two hundred and fifty hours' service at

1700° F., whereas cast nichrome boxes under the same conditions quite commonly give seventy-five hundred hours' service, and in some cases as many as eleven thousand hours' service has been obtained. While nichrome castings are more expensive than cast steel or cast iron containers, the difference in cost is more than offset by the superior qualities mentioned, and by the low operating cost per hour, which its use assures.

FIG. 2—ROTARY RETORTS.

An important industrial application of cast nichrome is the dipping basket and holder used in immersing small heated iron or steel parts in a carbonizing cyanide bath at 1700° F. Similar baskets or utensils are used for pickling purposes and heat treating work. These nichrome baskets may be used for a considerable period of time without being appreciably affected by the cyanide, nor do they shrink or lose weight They are about one hundred times as durable as iron or steel wire baskets.

Rotary retorts (see Fig. 2) of cast nichrome for gas furnace applications are used in a great number of plants throughout the country with a life at temperatures of 1600° F. to 1800° F. of from eighteen months to two years, as against twenty days to four weeks with ferrous materials.

Tubes of cast nichrome are used in many processes, as in the manufacture of hydrogen and rare gases from the atmosphere, or the treatment of wire in the manufacture of lamps, and also in the ball bearing industry.

Miscellaneous Applications of Cast Nichrome

The fact that cast nichrome withstands high temperatures, has enabled this material to be used for many important industrial purposes, besides containers for heat treating processes.

Cast nichrome is being substituted for other materials for many parts of special glassmaking machinery, for equipment for melting, pouring, conveying and rolling molten glass. The nichrome molds withstand a high temperature and produce more highly polished glassware. As in other applications, the molds are strong while hot, and therefore can be made much lighter than cast iron molds.

The Telautograph and Its Uses

An objection to the telephone is that it makes no record. For purposes where accuracy and a written record are required, the telautograph, which gives electrically, at any distance, an exact facsimile of writing or drawing done at the transmitting station, is being substituted in many commercial and industrial plants. How it now serves a valuable purpose in great steel mills is described by a contributor to the "Iron Age." These mills, we are told, have had to resort to messengers for carrying and distributing messages and analyses. The use of the telautograph does away with this unsatisfactory and dilatory service and reduces cost as well as increases the speed of distribution. We read in the magazine named above:

"Whatever the saving in dollars by eliminating the messengers' salaries, after all is far less than the indirect saving accomplished through the quicker delivery of analyses to the points where the progress of the work is dependent upon them. This is particularly and strikingly true at the open-hearth furnace. Before the telautographs were installed, in one plant, one hour elapsed between the time a sample was taken of the heat of steel from the open-hearth bath and the time the messenger came back from the laboratory with the analysis. All this time the steel was oxidizing and changing its constituency and the work of the plant was halted. With the use of telautographs this period of waiting has been reduced to about one-half hour, and therefore the melter at the open hearth is able to perform his duties more skilfully and more effectively.

Blast-Furnace Department

"In the blast-furnace department the chief gain also is not in money saved through the employment of less labor but through increased efficiency obtained by getting laboratory reports quicker, and thereby enabling the mixers and furnaces to handle their work with precision.

"In the blooming-mill it is impossible to say just how many dollars and cents are saved by the telautograph through the elimination of mixing of heats which results in the shipment of wrong qualities of steel to the various customers. It is not possible to estimate how many mistakes would be made and how costly they would be if the telautographs were not used to keep things straight. Very often ingots have been rolled into billets, cut into required lengths, and loaded on flat cars for shipment when it was discovered that the steel had probably been mixed, making it necessary for a chemist to enter the car and drill a sample of every billet for analysis. Also frequently errors in mixing are not discovered until shipments have been received by a customer, and the plant officials were not aware of the fact until they received the complaint.

"The telautograph is not limited to the sending of words only, but it can transmit numerals, signs, symbols, sketches, or anything else that is written at the transmitting end and accurately reproduce them at the receiving stations. Furthermore, it can send messages to a single point or simultaneously to any number.

Specification Records

"Practically all orders for iron and steel contain specifications describing just the quantities of carbon, silicon, sulphur, phosphorus and manganese that the materials to be delivered on the orders should contain. Each order is given a heat number to identify it throughout the plant, and copies of the order with specifications and heat numbers are sent to the laboratories, blast-furnaces, open-hearth and Bessemer mixers, soaking pits of the blooming-mill, chief recorder of the blooming-mill, hydraulic shears, billet and bar-mill, breaking-down mills and bloom yard office or other place where lies the control of final assignment to orders of heats or blows of steel."

The manufacture of all steel starts with the blast furnaces and the mixers. A sample of each heat from the blast furnace is sent to the laboratory for analysis and the results are written simultaneously to telautograph stations at the blowers and the mixers. This enables the blowers to know just what kind of iron they are making and whether they are approaching the specifications, while by obtaining this information in advance the mixer is able to prepare for handling the ladles when they arrive. This same plan runs through all the other operations in the mill. In addition the telautographs are employed at the billet-mill and at the shears to notify the chief recorder when any breakdown occurs and how long it will take to repair the damage. This enables him to plan a re-distribution of the work. To quote further:

"According to the geographical layout of the mills the need of various special telautograph services develops in different mills. In some they make good use of a telautograph line between the tube-mill and the tube-mill shipping-office for the shipping-office to report the names, numbers, and weights of freight cars they have loaded, together with the net weight of material in the cars.

To Those Interested in the Drafting Course

SO great has been the demand for reprints on our Drafting Course that we felt this demand was worthy of special consideration.

"Are the reprints satisfactory in every way, or would it be good policy to republish this course from Part 1?" we asked various outside responsible parties, and in every case this suggestion met with immediate approval.

As one party remarked, "Why not run Parts 1 to 7 inclusive every week in place of every two weeks? Offer prizes as before. Let new students have an equal chance to earn prizes, but also allow old students to again participate. It will only take seven additional weeks to run these former parts, and you will have given all an equal chance in this very necessary study."

So, following this advice, we republish Part 1 in this issue, and suggest that students, old and new alike, send in their work for judging as early as possible. Part 2 will appear next week.

Three prizes will be given for each part as heretofore, and as the number of students is greatly increased the competition is bound to be keen and full of interest.

The sooner we receive the plates, the quicker we can announce the winners, so again let us say: "Let us have your work promptly."

We shall be pleased to receive the opinion of students in general regarding our policy of republishing the course in this way.

Canadian Machinery Drafting Course, Part I

The Full Page Announcement on Page 345 Fully Explains Why We Republish This Portion of Our Course. We Hope the Interest Shown Will Continue, and Increase as Time Goes On

By J. H. MOORE, Associate Editor Canadian Machinery

BEFORE re-entering upon this series of talks or lessons on the art of mechanical drafting, the readers, both old and new, must realize that we could never, through the medium of a paper of this nature, conduct a rigid and very detailed course, for such would take years to complete, and ten chances to one become tiresome to the average reader.

What we do intend, however, is this, that for the reader who wishes to grasp the art of drawing as quickly as is practical and possible, we will prepare for him such lessons as we believe will help him along. The idea of re-issuing the seven parts which we formerly published is two-fold. First, to accede to the wishes of the many new students, and to be fair, we want to give them an equal chance from the beginning, while secondly, it will, after all, do no harm to those already enrolled to go over the ground once more, and perhaps win a prize where they did not before.

It is only a matter of seven weeks' difference, for in these reissues we will publish a portion every week in place of every second week.

We are especially desirous of having the students send in their work. We, in this way, see how they are progressing and know that a keen interest is being taken in the course. We expect about 250 students to be taking part in these lessons, so keen competition is sure to be the rule. Old students and new alike are eligible for these prizes, so let us see your work as early as possible.

Regarding the course, we will try to only touch on the most essential points as we go along, keeping in mind that this is a course specially arranged to meet the requirements of the machinist apprentice, in order to illustrate to him the basic principles of mechanical drawing and its application to the working drawing.

We will work up gradually from the straight line problem into the actual assembly drawing, but will go to such a stage by easy steps. We want the apprentice to feel that here is a course specially arranged for him, and should he get puzzled at any time that we will be only too willing to answer him, and lift him over the difficulty. Close study of this course should increase the earning power of the student, and besides, the objective of each student should be to land at least one prize. So now that we have introduced the object and aim of this series, let us proceed at the very beginning and see what mechanical drawing really is.

Mechanical Drawing

To put it as briefly as possible, mechanical drawing is the method of showing graphically the intricate details of machinery. It is, so to speak, the language by which the draftsman speaks to the workman. A brief study of a well-executed drawing gives a much better idea of the machine portrayed than a long-winded verbal, or even a detailed written, description would ever do. In fact the better and clearer the drawing is made the easier the workman can comprehend the ideas of the draftsman.

A neat drawing for instance was never made by a careless worker, nor even by a good draftsman with poor instruments, but as you seldom see a good designer with poor instruments one can usually tell the character of the draftsman by his style of drawing.

To the beginner, however, a cheap grade of instruments would suffice, but as he becomes more expert he would do well to secure a better grade of tools. In fact, if one can afford it, the best plan is to purchase the better grade right at the start, but this is simply a matter which rests with the student himself.

Instruments and Materials

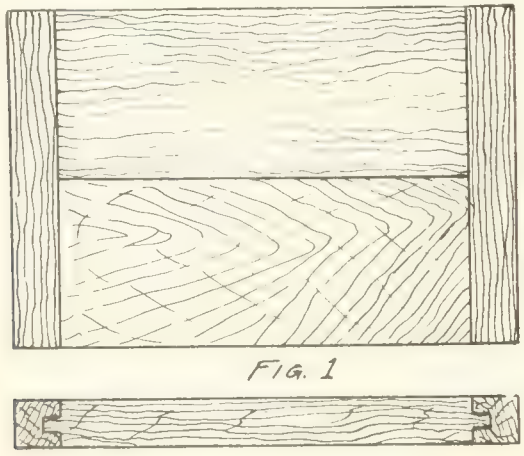
First comes the question of paper. In selecting drawing paper, the first thing to be considered is the kind of paper most suitable for the proposed work. As we are principally interested in the needs of this course, we will consider only the paper most suitable for our purpose, for practically every drawing office throughout the country have their own particular pet paper, which they claim is the best ever.

To keep the expense item down to the lowest possible figure, we will call for sheets 9½ x 13½ in. in size. This allows students to purchase their paper in what is called the demy size of sheet, this being a sheet 15 in. x 20 in. By careful cutting you have two sheets from each large one, 10 in. x 15 in., sufficient size to cover the work. Whatman's paper is considered by many the best grade of paper, and either the cold pressed, or hot pressed, will answer the purpose. The hot pressed paper has a smoother surface, but does not stand erasures as well as the cold pressed sheets, so it might be well for readers to get the tougher material, for no doubt there will be considerable erasure made at the beginning.

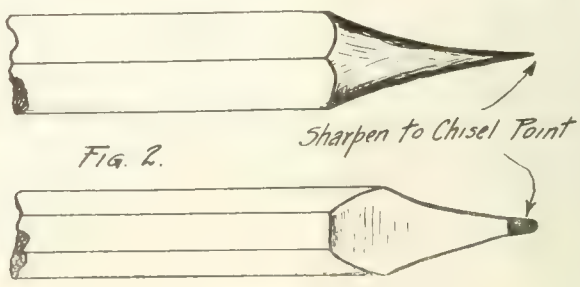
Drawing Board

The drawing board, Fig. 1, is usually made of well-seasoned, and straight grained soft pine. Each end is protected by a side strip, usually about 2 in. wide. This strip is trued accurately to suit the T-square, but as students will more than likely purchase their drawing boards, we will leave this matter for the reader to study at his leisure.

Thumb tacks are used to fasten the paper to the board. There are all kinds on the market, but a grade about 10c to 20c a dozen will suit the student's purpose admirably.



SKETCH OF DRAWING BOARD.



SHARPENING THE PENCIL.

In regard to the pencils required. Lead pencils are graded according to their hardness, the degree of which is indicated by the letter H. For example, H means simply one degree of hardness; 6H, six degrees, and so on. A pencil of 4H grade is ideal for general working conditions. Some authorities claim 2H or 3H are better suited for lettering purposes, while for intricate detail work a 6H pencil will be found best suited to this class of work.

The hard pencils should be sharpened as shown at Fig. 2, so that in pencilling a drawing the lines may be made very fine and light. The wood is cut away so that about ¼ in. to ⅜ in. of lead projects. Lead can now be sharpened to a chisel edge as shown on the sketch. In the drawing of the lines the student should place the chisel edge against his T-square, or triangle, enabling him to draw a clean-cut fine line, through points as desired. Should no inking be necessary, a softer grade of pencil is used than if it is intended to ink in over the pencil work.

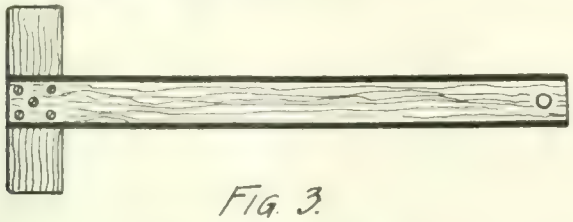


FIG. 3.

SKETCH OF "T" SQUARE

T-Square

The T-square gets its name from its general appearance, and consists of a thin straight edge called the blade, with a short piece called the head, and fastened at right angles to it, see Fig. 3. T-squares are usually made entirely of wood, pear and maple, in the cheaper grades; mahogany, with protection edges of ebony, in the middle class, while celluloid edges are placed on the more expensive ones. Readers need not go to much expense on this end, except they really wish to, for a T-square of good quality can be secured for very little cost. Some T-squares are also provided with swivel heads, but for the purpose of this series we will not discuss this point, as it is not a necessity.

To show clearly the use of the T-square, refer to Fig. 4. Always keep the head A up against the left-hand edge of the board, otherwise the various lines drawn will not be parallel. Lines A, B, C, D, and E, are drawn ¼ in. apart and 6 in. in length.

Take a piece of paper and practise this exercise. You will be surprised how the pencil will want to go still further, until you learn to control your hand properly. Mark your ¼ in. distances with your rule, and draw your vertical lines 6 in. apart with a triangle, which we will now describe, both as to its uses and material.

Usually triangles are made in two styles, 45 degrees and 60—30 degrees as shown at Fig. 5. A represents the 45 deg. triangle, while B illustrates the 60 deg. —30 deg. These instruments are made of wood, steel, celluloid, or rubber, depending on the price. The student's pocket-book capacity can be his guide as to the kind he purchases.

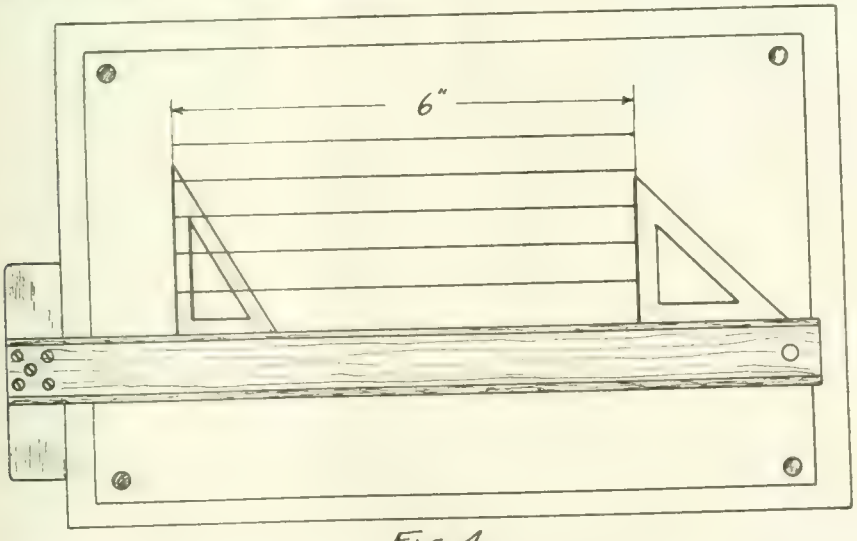


FIG. 4.

PRACTISE LESSON ON HAND CONTROL.

A 6 in. or 8 in., a side size, will be found convenient for most work, and will be ideal for this course. By purchasing a triangle of each style as already described, the student is well equipped for such work as the course will present at the start.

Taking it for granted that the student has now a drawing board, T-square, pencils, rubber, and triangles, we can go ahead with the exercise at Fig. 4.

First practise making the lines A and B 6 inches apart. Draw these vertically by means of the T-square and triangle, either one, as shown. Next use the T-square only, and draw your horizontal lines, meeting the vertical lines, yet not going over them. This is most important, for the exercise is simply one to teach control of the hand. All lines must touch, but not go over, yet be sure of the point, that they much touch. Draw these horizontal lines ¼ in. apart, marking off the spaces with your ruler, or scale, as it is usually called.

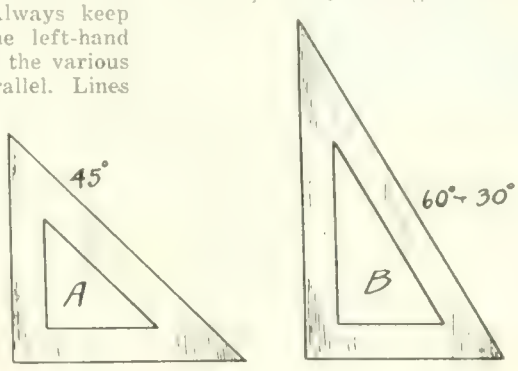


FIG. 5.

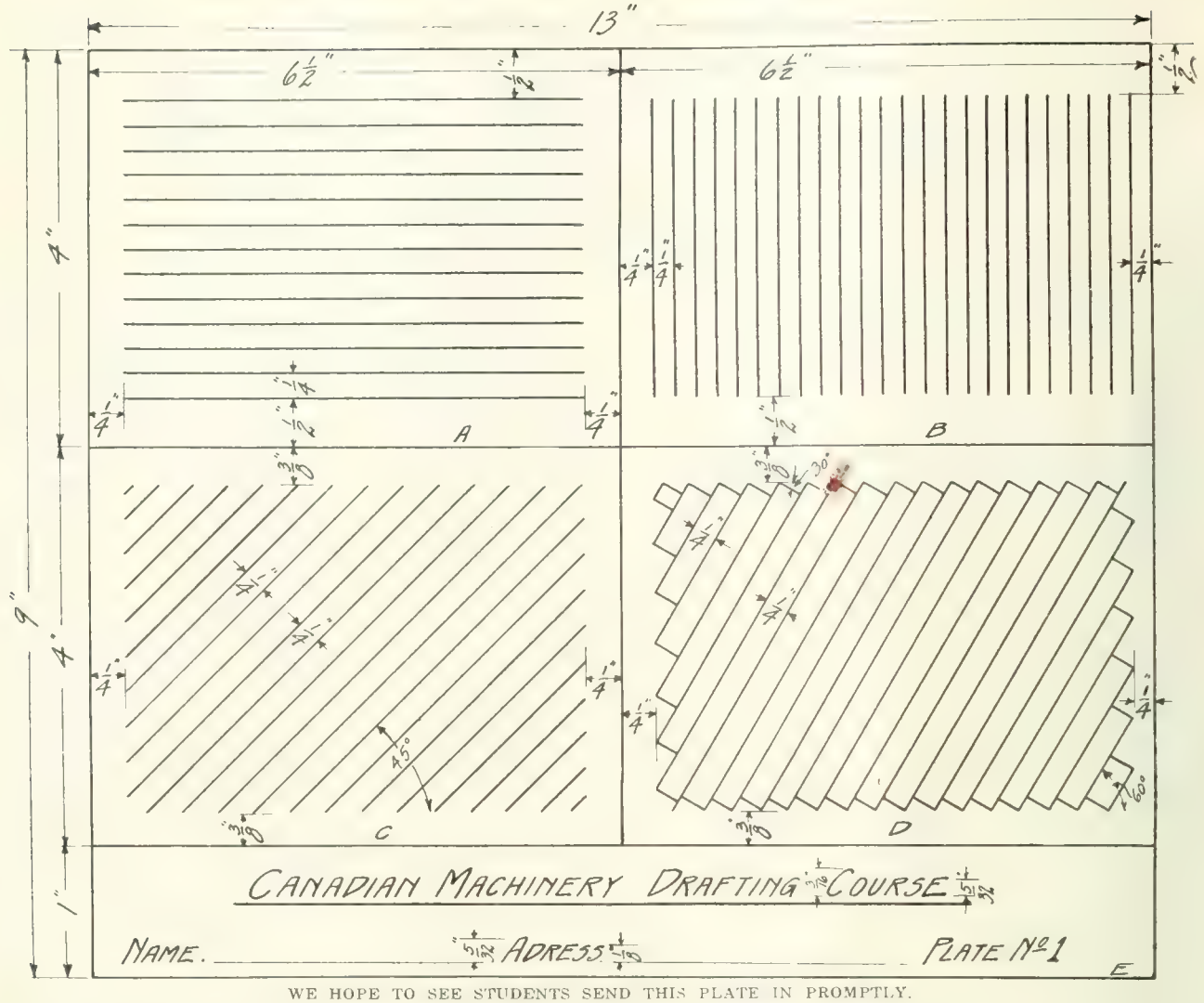
SKETCH OF TRIANGLE

After you believe yourself proficient enough, study Plate No. 1. To the best of your ability follow the instructions closely, draw up the plate, and send us in your work.

To the three neatest plates received, we will award a prize in the shape of a special 6 in. steel scale, with drill sizes, decimal equivalents, etc., stamped on its face, and in all future issues on this series, will carry out the same plan, forwarding a scale to the three best and neatest plates received on each part or plate.

Instructions

First tack a piece of paper 10 in. x 15 in. on the drawing board, using T-square to see that it is placed on fairly square. Now draw the trimming lines 9½ x 13½ in. Next draw border lines as shown at Plate No. 1, 9 in. x 13 in., and join. Divide the sheet up into 5 sections A, B, C, D, and E. In portion E print in the lettering as shown, and while we do not expect this lettering will be of splendid standard, still it will help you to get ready for the separate lesson to come later in the course. In section A, complete the horizontal lines, each ¼ in. apart as illustrated, stopping ¼ inch away from the border, and dividing lines. In section B, draw up the vertical lines, following out the dimensions given. At section C, draw 45 degree lines as shown, using your T-square and sloping edge of 45 deg. triangle. At section D draw up the 60



WE HOPE TO SEE STUDENTS SEND THIS PLATE IN PROMPTLY.

deg. and 30 deg. lines as illustrated, using your 60 deg.—30 deg. triangle, together with your T-square. In all cases study the plate carefully, and work to the dimensions shown.

Remember that neatness counts. For the drawing of this plate use a 3 or 4H pencil, and make your lines decided, and plain. Send us in your work as soon as you can. We will judge each plate two weeks after its issue, giving you lots of time to send your work along steadily, so get busy with a capital B, and watch for Part 2, which will further explain the various instruments, and their uses. When sending in your plate, use the coupon, and fill the same in carefully. At the same time if you feel so inclined, write us your ideas on this course, and if it appeals to you. We are mighty anxious to make this course of great benefit, so let us hear from you when your work comes in.

In studying the plate, do not pay any attention to the scale shown on the sketch. Work to the dimensions given, and the result will be what we want. We purposely do not give you an exact copy to work from, but rather let you prove that you have followed instructions closely. It is not necessary to ink in this first plate, so as stated before use a 3 or 4H pencil, and make your lines plain and decided.

Mail your plate flat, do not fold, or if desired you can roll it up and place it in a regular mailing tube. Be sure you have sufficient postage placed on the same. We will not return plates unless specially requested to. In such cases return postage must always accompany the request. Address all correspondence on this course to CANADIAN MACHINERY Drafting Course, McLean Publishing Co., 143 University Avenue, Toronto, Canada.

Tear off and send with drawing

Name .....

Address .....

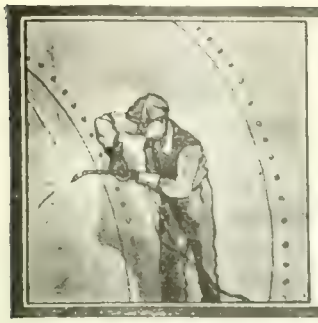
Position .....

Firm's name.....

The Germans have not the glory of being the original gas-attackers; for a certain kind of beetle has been gassing its enemies for centuries. When it sees a gargoyle-like creature, it promptly ejects an explosive fluid from the last ring on its abdomen.

This fluid smells very much like nitric acid, and consequently is a great help to the beetle in its battle for existence.

The War Department's 15,000,000 excess hand grenades are to be remodeled as penny and dime-savings banks, and will be distributed to schoolboys and girls who can show one or more War Savings Stamps earned during the coming summer.



WELDING AND CUTTING

Milling Machine versus Oxy-Acetylene Machine

An Interesting Description of the Work Done by a Straight Line Cutting Blowpipe in Cutting Slots in a Slip Socket—The Dimensions of Same Deserve Attention

THE cutting of slots or openings in steel or wrought iron is a machine shop operation that requires a great deal of time when performed by milling machines, drill presses, broaching machines, or any of the other machine tools. The cheapest known method of performing the operation is by means of the oxy-acetylene cutting blowpipe. Such cutting can be done free hand with surprisingly good results, but where an absolutely true cut is desired, it is advisable to use an Oxweld straight line cutting machine, Fig. 1. The cut made with the aid of this machine is as true as a cut made by any other method, and almost as clean, in fact for most purposes it is sufficiently clean without any further finishing operation. Even in the few cases where finishing is necessary in order to obtain an absolutely square edge, the time gained by roughing out with the blowpipe constitutes a big saving.

A very interesting example of this sort is furnished by Fig. 2. This picture was taken at the plant of the Acme Finishing Tool Company, Parkersburg, West Virginia, and shows slots cut out with an Oxweld cutting blowpipe, which were formerly cut at a much greater cost by means of a milling machine. This operation as applied to slip sockets, which are tools used for the purpose of "fishing" churn drill tools out of oil or gas wells after they have broken loose from the drilling rope.

FIG. 2 SHOWING SLOTS CUT IN SLIP SOCKET THIS PIECE WEIGHS 1600 POUNDS.

The steel slip socket illustrated in Fig. 2 weighed 1,600 pounds. The pieces cut out by the oxy-acetylene blowpipe were 3 inches in thickness, 26 [illegible] long, 4 inches wide up to 6 inches width at wide end. The cutting was done with

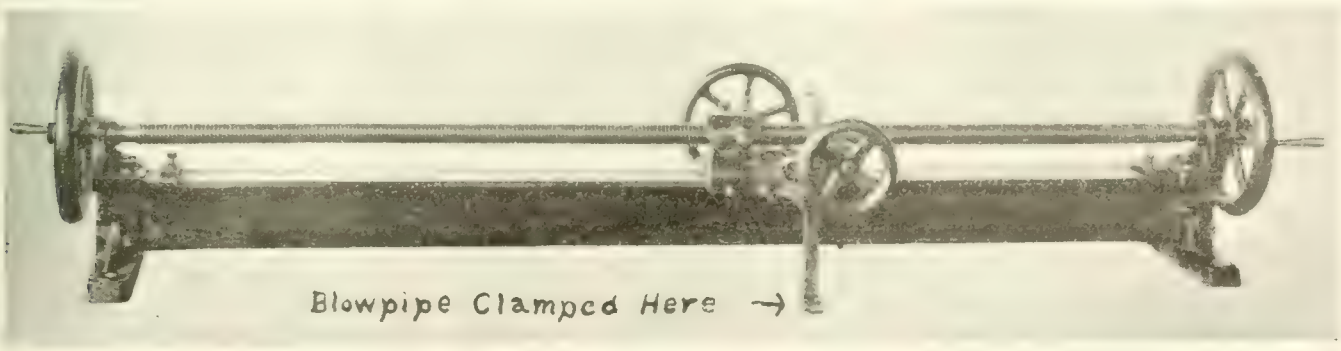


FIG. 1 A GENERAL VIEW OF THE OXWELD STRAIGHT LINE CUTTING MACHINE

the aid of the Oxweld straight line cutting machine, which held and guided the blowpipe, feeding it at a uniform rate of speed. By the aid of the straight line cutting machine the cutting was done so smoothly that no finishing was necessary. A cut of this sort is very easy to make, the rounded ends being the only parts causing any difficulty whatsoever.

Each of the two cuts was completed in eight minutes. Formerly it required one machinist eight hours to make both cuts on a milling machine; in other words the new method requires one-thirtieth as much time, and it is estimated that the net saving per socket by the use of the oxy-acetylene process amounts to $25.

Acetylene in Chemical Warfare

By MAJOR-GENERAL W. L. SIBERT, U.S.A.

Address delivered before the 1919 Convention of the International Acetylene Association.

WHEN I was in the Philippines and was confronted with the necessity of learning the Tagalog names of the cities and towns on the maps of that region, I felt that I could never accomplish it. Later, in China, when I had to have on my tongue's end such names as "Hwangho," "Yangtze kiang," "Chinkiang Pu," etc., I felt as if I were in a more hopeless condition than when in the Philippines. But when I first gathered together the representatives of the 1,000 research men of the Chemical Warfare Service, and they commenced to talk about diphenylchlorarsine, diphenylamine arsine, brom benzyl cyanide, chlorpicrin, etc., I felt more helpless than I did in the Philippines or in China, and told them that while all those things might kill Germans and win the war, they had to limit the substances to the number of names that I could remember.

I can understand why the doctor who depends often upon the psychological effect of things still adheres to Latin names, but the chemist ought to simplify his nomenclature if he expects the support of the everyday man.

I do not know anything about acetylene, except the uses to which the engineer puts it in cutting up and welding steel with the oxy-acetylene flame, and by the use of an acetylene light converting night into day.

I remember in Panama when the work indicated the necessity of transferring a dredge from the Atlantic side of the Isthmus to the Pacific side, and it was not practicable to tow it around the Horn, a plan was adopted of dismantling the dredge, cutting the hull on cross section into pieces that could be handled by a wrecking crane, loading them on cars, shipping them across the Isthmus, reassembling them on ways, and riveting a steel batten over the cracks; all of which was possible on account of acetylene.

My mind within the last year has been drawn to the necessity of chemical development in every direction in this country. When one looks back he must appreciate the absolutely helpless condition the United States would have been in prior to 1917 had it been called upon to prosecute a war with a great nation, and had it been unable to control the seas. Its effort to resist a foe would have been on a par with that of China. It would not have had powder enough to last two weeks, and would have had no nitrates out of which to make more. The absence of a dyestuff industry with its by-product coke-ovens, would have limited the supply of raw materials for the manufacture of explosives and gases. Future will be more and more chemical wars, more and more scientific, and the nation that has developed its chemical possibilities will enjoy a great advantage.

One of the big questions presented for solution to-day in this country is chemical preparedness for war, through the development of chemical industry that has peace application.

There is nothing to indicate that Germany, prior to the war, had made any systematic arrangement to utilize her dye factories for war purposes, because many of her chemists were in the beginning called into military service. This and many subsequent developments of chemical plants for war needs causes one to think that Germany confidently expected the war to end in a very few months, that she had sufficient materials in storage, and that her mind was not turned to the full utilization of the chemical resources of the nation for the support of the army, until after the results at the Marne.

There is one notable exception to this, and that is the development of the processes for the production of ammonia from atmospheric nitrogen. It was not until the end of 1912 that there was any large scale production of ammonia by this method. In other words, the great war was not brought on until the way was clear—that is, it was not brought on until Germany could produce within her own boundaries a supply of ammonia and nitric needed in the manufacture not only of her propellants, but also for the fertilization of the land, so as to make the feeling of the army certain.

When it became apparent, after the battle of the Marne, that the available supply of material for the manufacture of suitable propellants and explosives would soon be exhausted, it was then that the great chemical establishments of Germany were called upon to convert their plants, that had been utilized in making dyestuffs, into high explosive plants and gas plants; it was then that the chemists that had been drafted into the army were returned and utilized with existing plants and with necessary extensions—all in order that the needs of the army might be met. The existence of this great potential reserve made Germany a powerful adversary.

It is a peculiar fact that if you probe nearly any line of chemical industry you will find that it has a war application as well as a peace application. You gentlemen are engaged in the carbide and acetylene industry, and while I am not a chemist, I would take a few minutes of your time to mention some of the ways that our people think the manufacturing plants for acetylene may be a preparation for war. Of course, the ordinary uses of it, the process of welding and cutting steel, and its use for signal flares and illuminating processes, need not be repeated. The use of burning acetylene to light the fields of England in order that all the land possible might be planted, is merely an extension of a well-established use.

The great development of airplanes in this war called for a large supply of acetone for the preparation of airplane dope. The synthesis of this chemical commodity as well as acetic acid, beginning with acetylene as a starting point, is now a commercial reality. The Government expended over $100,000,000.00 in its nitrate plants, which nitrates were to be used in making propellants and fertilizers, both in times of peace and in times of war. The largest of these nitrate plants utilized the cyanide process of fixing nitrogen, and this audience need not be told that cyanamide in turn is prepared from calcium carbide.

Mustard gas is prepared from ethylene, which is usually prepared from alcohol. Have we not in acetylene a raw material from which ethylene can be prepared on a successful commercial basis? Further research and development may establish such a fact. In fact, our research people tell me that the entire subject of the chlorination of acetylene, and the preparation of its chlorine derivatives, is one that should be carefully investigated, not only from the standpoint of chemical industry in times of peace, but also from the standpoint of the preparation of raw materials for war needs.

The interaction of acetylene with phosgene, with arsenic trichloride, with stannic chloride, and with antimony trichloride, are all fertile fields for investigation. It is apparent, therefore, that we have in the acetylene industry, an association with war problems which may be as important as the association of the coal-tar chemical industries with such problems.

What the Government needs is chemical industry in every line that nature has made it commercially practicable to develop. We want to be in the same position that Germany was in during this last war, so that whenever research indicates that some new substance or some substance hitherto not manufactured, has a military value, the heads of the chemical interests of the country could be called together and given the problem with the full expectation that they could solve it and would solve it. that some existing chemical plant could be changed into one suited for making this substance, that the various well-

tried research establishments could soon overcome any difficulty in its manufacture, and that there would always be a personnel available for such manufacture; because this war has shown more strongly than it has shown anything else, that a country without an extensive organic chemical industry will be seriously handicapped in war against the nation that has such industry.

Of course there is no need for me to tell this audience these things. If they stop to think they will know them. But it is always well to impress upon people that there is a public use that might be made of their appliances when their country is in need, because the average man takes pride in assisting his Government when it is in need.

This country needs now to develop a certain and sure nitrate supply; it needs to develop large dyestuff industries; it needs to have its acetylene industries developed and protected, if need be against hurtful foreign competition.

Chemical warfare, as such, made its first appearance in this war. It probably caused more casualties than any other single implement in the war. It has in it more possibilities than any adopted implement of war. If the Chemical Warfare Service of the Army keeps closely in touch with all of the chemical industries of the land, if such industries are sympathetic with the needs and aspirations of the Government, and each of them exchanges research information of value to the other, and if the Congress of the United States insures the development of such chemical industries, we can trust to the ingenuity of our chemists and chemical engineers to see that his country enters no future war except upon equal terms with any adversary, in so far as chemical warfare is concerned.

Had the Germans known at Ypres the effect of the first chlorine cloud that they passed over the allied lines, and had they had confidence in their own protective devices and followed closely such chlorine cloud, they could have penetrated to the channel ports—all of which shows what the surprise use of a chemical substance means.

Although the gases used in the great spring drive by the Germans in March and April, 1918, were known gases, the new tactical use of gases made possible through Germany's ability to make them in great quantities almost caused a German victory. By saturating the strong points of the line with mustard gas for 48 hours before an attack, back to a depth of five or six miles, and by saturating the road crossings through which reserves and ammunition must pass, one of the English armies in the first onset in March was largely paralyzed —its strong points were made ineffective, and the weak points easily taken.

The inspection of the German gas plants in the Rhine district indicates that this country has nothing to fear in the chemical world provided competition is fair and protection is the same. I wish the statesmen of this country could visit Edgewood Arsenal, and see what our people can do when put to the test.

AN IMPORTANT AFFILIATION

Continued from page 342

the students and sponsors of the department of Industrial Medicine will be tackled at the industrial research laboratory.

This plan being carried out jointly by the College of Medicine of the University of Cincinnati and the Cincinnati Local Council of the National Safety Council which represents the first attempt in America to train doctors for industrial work, in the opinion of C. W. Price, general manager of the National Safety Council, promises much for other cities.

"The Cincinnati plan grew out of a very definite need," Mr. Price said. "During recent years there has been a great call for industrial physicians but there was no institution that gave special instruction in industrial medicine. The new department of industrial Medicine and Public Health of the University of Cincinnati special courses for the training of industrial physicians and surgeons are now being offered. In connection with the regular medical courses the student will be given instruction in industrial medicine, shop sanitation, occupational hazards and diseases, labor economics, labor conditions and problems, industrial relations, accident prevention and employment. "The product of this special training will be not merely an industrial physician, but an executive who in the larger plants can take charge of an Industrial Relations department that would include, the safety engineer, the plant physician, the employment manager and others. The men who receive the special training offered at Cinninnati also will fill a long-felt want among the smaller industrial plants where conditions do not justify the hiring of a safety engineer, a physician, and an employment manager. In such a plant all three of these positions could be filled by one man with the training now available at Cincinnati."

Dr. Carey P. McCord, who did notable work in organizing and conducting military hospitals during the war has been appointed director of the Department of Industrial Medicine and Public Health of the University of Cincinnati. The National Safety Council will be repreented at the school by C. H. McLain, formerly safety engineer and assistant to the supervisor of labor at the Dayton Electrical Company, Dayton, O., who has been appointed secretary of the Cincinnati Local Council of the National Safety Council.

The Cincinnati plan provides for the co-operation of the National Safety Council, not only with the University of Cincinnati, but with the general educational system of that city. The secretary of the council will give twelve lectures on school and public safety in the teachers' college of Cincinnati, so that the teacher in making will be prepared to pass on such instruction to young America. Later, a similar series of lectures will be given to a class made up of one of more teachers from each public school in Cincinnati so that she in turn may acquaint fellow-teachers with the fundamentals of education in accident prevention.

Finally, a course of safety lectures similar to that given at the National Safety Council's schools for safety supervisors at St. Louis, Cleveland, Pittsburgh and Rochester will be given to every class in the Engineering School of the University of Cincinnati.

An entire general session and two sectional meetings of the Eighth Annual Safety Congress of the National Safety Council, which is to be held at Cleveland, O., October 1st to 4th, inclusive, will be devoted to discussion of health service in connection with organized accident prevention work.

The program of the congress, just issued, lists 160 speakers, including some of the men most prominent in the practice of industrial medicine. It is expected that more than 3,000 safety engineers, industrial physicians, plant managers and others interested or actively engaged in the work of accident prevention will attend the congress.

Dr. Charles A. Lauffer, medical director of the Westinghouse Electric & Manufacturing Company, will preside at the general health session on the afternoon of October 3 in the ballroom of the Hotel Statler at Cleveland, and at the health section meetings during the mornings of October 3rd and 4th.

While not generally known it is a fact that during the nineteen months of our participation in the war with Germany, the casualties from accidents in peaceful America were more than twice as great as the casualties among the American troops in France. The statistics of the United States census show that more than 70,000 persons died each year as the result of accidents in America. It is estimated that 20,000 of these deaths are caused by industrial accidents and 50,000 by accidents in the streets and homes.

It has been the experience of men and women engaged in organized accident prevention work that a large number of the deaths attributed to accidents result only indirectly from accidents and more directly from causes than can be eliminated by health education. The National Safety Council and the 3,300 industrial concerns included in its membership are, therefore, giving more and more attention to health education and health service in the war on accidents.

An Imperial Mineral Resources Bureau has been established in London, charged with the duties of collecting information regarding the mineral resources and metal requirements of the British Empire and of giving advice to the Government authorities in reference to the same. The Bureau is to be directed by a board of governors, comprising one appointed by the Home Government, who will serve as chairman, one by each of the five self-governing dominions, one each by the Government of India and the secretary of state for the colonies, and six representatives of the mineral, mining and metal industries.

WHAT OUR READERS THINK AND DO

Another Outburst on the Parting Tool Question

We Invite Readers to Send Us Their Practical Experiences. There is No Reason Why This Page Should Not Go Strong, so Send Us Your Ideas, and When Published You Will Be Paid For the Same

CURLING OF THE CHIP

J. H. RODGERS

In the setting of parting tools one of the most important factors to consider is the relative position of the cutting edge to the direction of the feed.

Some operators advocate a slight rounding of the nose, so that the edges of the chip will tend to curl to the centre as the tools advance to the work.

This method frequently assists the easy cutting of the metal, but the essential point to keep in mind is that the neutral line of the cutting edge—be it slightly rounded, or perfectly flat—should be at right angles to the direction of the feed; in other words, parallel with the axis of the lathe. The sketch will show the advantages of the above suggestion.

If the cutting edge is at an angle with the centre line, be it ever so slight, the chip will curl at right angles, forcing the cut metal against the edge A.

As the particles break off, they work down between the side of the tool and the slot, and force the tool to spring in the direction of the arrow, thus causing the side of the tool to bite into the side of the groove.

If the tool is not strong enough to stand this additional stress, breakage will follow.

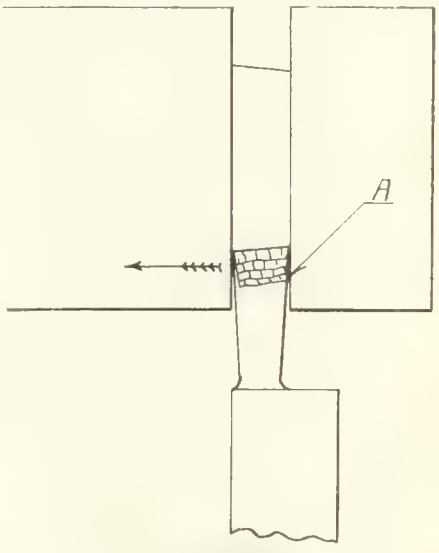
Clearance, rake, and set of the parting tool are essential to good results, but this feature of the curling of the chip must not be overlooked, otherwise the work performed will not be satisfactory.

ANOTHER VIEWPOINT

In your issue of July 17, on the subject of parting tools, I am one reader who does not coincide with the views of the author. First of all I could not say that "The most peculiar thing is the lathe nearly always gets blamed in connection with parting off stock." As I have seen troubles in that connection in shops where the parting is done entirely with saws (which is the best method where there is any depth of cut and wherever practicable).

As I presume the discussion is on what is commonly known as the parting tool, however, I will not say any more about the saws. As to the ordinary forged tool being the best, I would modify Mr. Ernest's statement and put it in this way: That it is the best for lathe shaper or planer where there is any depth of cut to be taken.

I agree that there must be clearance from the cutting edge in every direction, front, top and sides. The corners should have all the support that it is possible



THIS IS MY THEORY.

to give, and still have clearance about one degree on each side away from the corners, front clearance about five degrees for the lathe tools and three degrees for shaper and planer tools. There should be a lip ground on the top about ⅜ of an inch radius, deep enough to make the top slope from cutting edge about twelve degrees. Care must be taken in the setting of the parting tool to get the support as directly under or behind the cutting edge as possible, as the more overhang, the more apt it is to break.

The flat steel with the Armstrong holder is a very handy tool to have around the lathe or shaper where the parting cut is not very deep, but it does not take the place of the forged tool entirely. I would not recommend the method of peening the edge with a hammer as I prefer to find the blades too hard to do that; like the forged tool, you will find that grinding a slight lip it gives better results, and as the stock used in the Armstrong holder has about one degree clearance on each side by having a lip it leaves the cutting edge a little wider than the bottom of the lip, when you take this tool to the blacksmith and have it upset that defeats its purpose I would avoid this and keep the tool for the work it is best adapted for.

I have found that the ideal position of setting a parting tool is (whether it be single or double) the one commonly used in special cutting-off machines, where the tool holder is shaped on the side nearest the chuck to take flat stock, held firmly by a clamp on top, the tool is set on a slope of 13 degrees, this position giving the cutting edge the best support; being ground straight on top gives the same effect as a lip on a tool that is set horizontal. The front is ground at an angle of 18 degrees. This type of tool can stand more side clearance than the ordinary forged tool. For heavy work, such as cutting off billets for shells ¼ in. by 2 in., flat stock was used; this can be upset to ⅜ in. wide at the point and be used until it is less than 5-16 of an inch, keeping the same clearance away from the cutting edge always.

It will be found that when this type of tool is used single, it should be set with point a little above centre so that any spring or slackness there might be is taken up and it is working at centre.

A simple method for upsetting these tools is to cut a piece out about half the width of the tool and ½ inch from the end, leaving a shoulder to rest on the anvil, flattening out the point, then turned over with top of tool on anvil, then hammered on sides and end, reheat and cut off the corner.

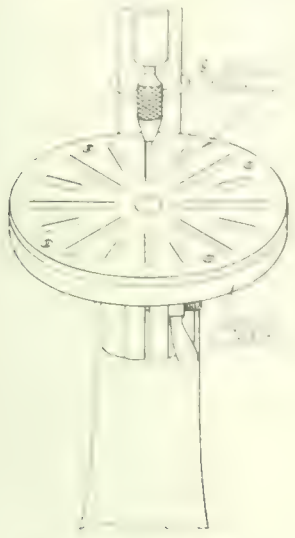
It is now ground to shape and hardened In conclusion I would say that

the most important points to be observed about the parting tools are that the cutting edge has clearance in every direction and that it is well supported in both grinding and setting.

DRILL TABLE PAD

By Chas. H. Willey

A simple idea like this one shown in the sketch may save some reader many dollars if he adopts it. It saved many for the writer, so I pass it along. The drill press table when new is perfectly



DRILL TABLE PAD

smooth and true, and inside of six months, if all hands are allowed to use it at will, it becomes sadly abused, scratched, scarred, nicked, drilled into, and otherwise ruined as far as being able to set up and drill accurate work. Eventually it means a new table will have to be gotten. To protect the table in the first place would be best, so when we installed a new drill I obtained a piece of ⅝ boiler plate and made a false top for the table and bolted this on. It is never removed except when fine, accurate work is to be drilled.

AN EMERGENCY LATHE NUT

By J. H. Houldsworth

It might be interesting to tell readers of CANADIAN MACHINERY how I made an emergency nut for the compound rest of a lathe which we wished to get into commission again at the earliest possible moment.

Having no time to cut one on the lathe, we secured an iron plate, and drilled a hole central in this plate, an exact fit for the spindle. In the case in point the size was 15-16 in. diameter.

Referring to the sketch, the remainder of the scheme is easy to explain.

We now constructed a framework of wood and placed the old nut on the spindle, then stood the assembled spindle as shown. We now made a regular mould of the affair, packing loam (or fireclay if desired) inside the framework constructed. We now withdrew the spindle and nut, removed the nut, and replaced the spindle in the central hole; we now poured a good grade of hard babbitt into this mould, when we had a good temporary nut to operate our lathe until such time as we could make a permanent one.

A KINK IN LAYING OUT WORK FOR THE SHOP

By F. A. McLæan

The most widely used methods of preparing work for laying out are probably those in which chalk is used for coating rough surfaces, and copper sulphate solution for finished surfaces or template work.

Both of these methods have limitations, as the copper sulphate is no good for rough surfaces, and chalk is of little use on finished work, and in either case the chalk often gets rubbed off, making the marks hard to distinguish.

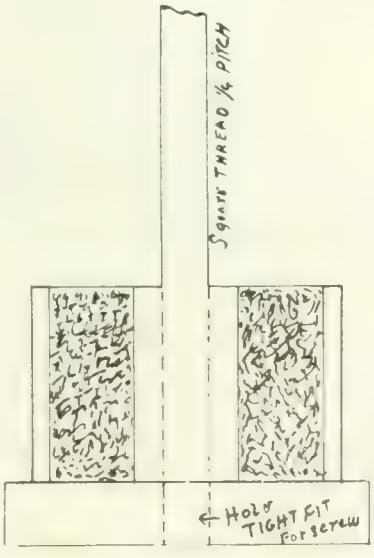
The use of a whitewash made of whiting dissolved in water will be found much more efficient than either of the methods just mentioned, as it will make a smooth coating on either rough or finished surfaces, and is not liable to be rubbed off accidentally.

More surface can be covered in less time as two applications of the brush will cover a surface that would require several minutes to coat with chalk or copper sulphate.

OIL CUP FILLER

By Chas. H. Willey

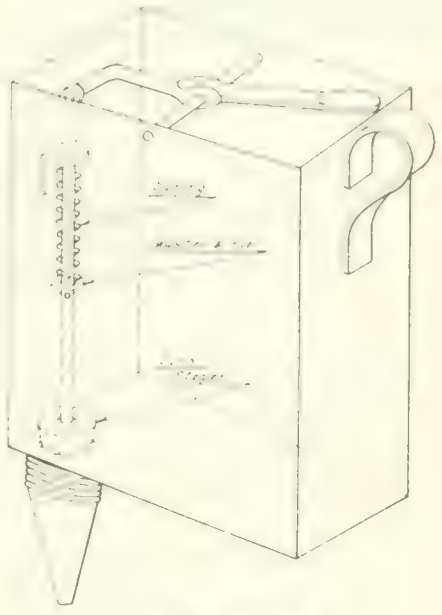
Here is another scheme for using up empty 1-gallon oil tins, and the device shown in the sketch is one that will be found advantageous in filling oil cups and reservoirs.



HOW THE NUT WAS MADE

To make it, the bottom of the oil container is cut out and then the arm and levers are made and fitted in. The place on the top edges of the device where the rocker shaft turns is reinforced by soldering on washers. The levers and fittings are very simple to make from ¼-inch rod, the joints being made by flattening and drilling, and the spring is made from small size brass wire.

A funnel of small dimensions is soldered into the screw cap opening and the flow of the oil is controlled by the pressure of the lever which raises the cork that is secured to the end of the ver-



OIL CUP FILLER

ticai rod. The sketch conveys the idea in clear form.

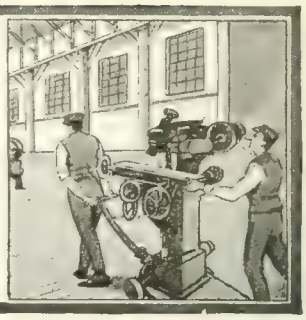
The Woodman and his axe are giving way to the engineer and his dynamite, for dynamite works much more easily and quickly than does the axe. You tie dynamite around the tree-trunk, then attach a fuse to it and set it off. Down comes the tree.

Colored Patient (in hospital)—"Boss, how do you all do yoh cookin in thah?"

Orderly—"Well, Sam, you know we have the latest fandangled methods over here; we do our cooking by electricity."

Colored Patient—"Hum, by e-lectricity, huh? Well, boss, you sho' ought to have given dem beans anotha shock."—Truth.

DEVELOPMENTS IN SHOP EQUIPMENT



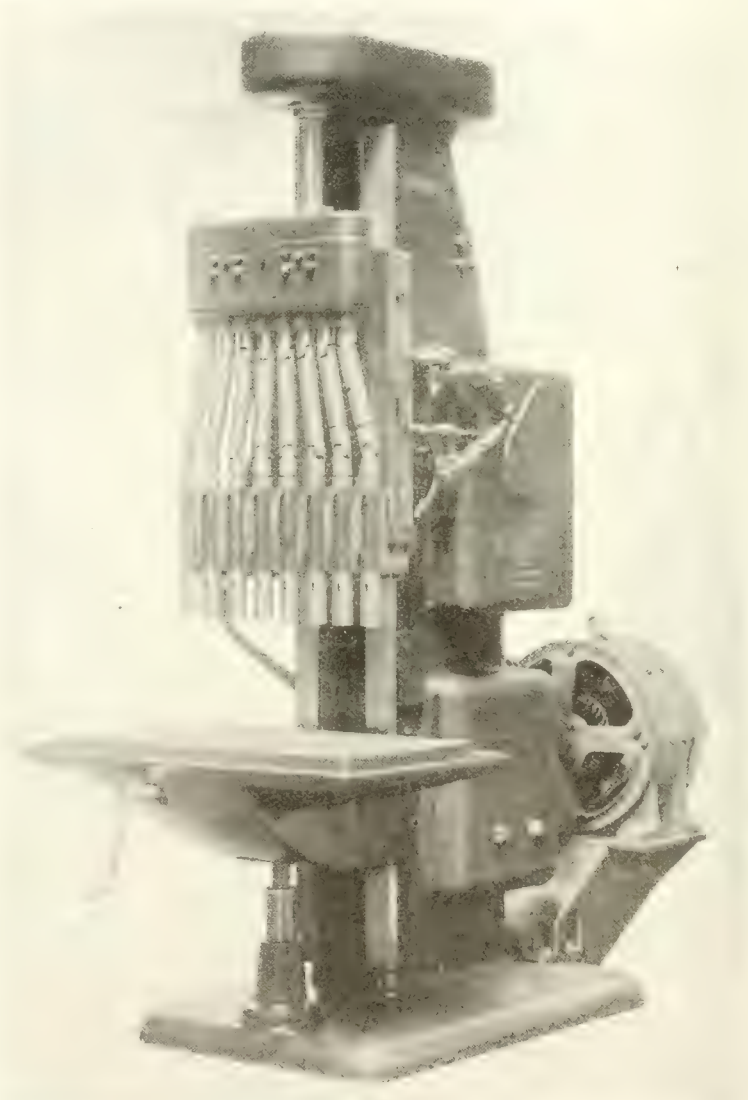
THE No. 10 multiple spindle drilling machine—with straight line adjustable spindles—as shown by the illustration on the opposite page, has been designed with improved features incorporated to meet the extensive requirements in a production machine for multiple drilling operations. This machine can be equipped with a group of spindles —with fixed centres— arranged in a straight line or in a cluster, or with a group of universally adjustable spindles arranged in a straight line, a rectangular or circular cluster.

The Speed Mechanism

The speed mechanism is located in the column near the base so that vibration, ordinarily excessive in a belt-driven machine, is entirely absorbed. Power is transmitted to a vertical drive shaft from a three-step cone pulley through back gears and hardened steel bevel gears. A Johnson friction clutch is used to engage the power and to select the back gear, and these back gears, when used in conjunction with the 3-step cone pulley allow six speed changes. The vertical drive shaft is fitted with a sleeve gear through which the spindles are driven, and this sleeve gear is made to slide along the drive shaft with the spindle head as it is fed either up or down, which construction provides a drive closely coupled to the spindle head at any position on the column. Back gears are unnecessary and are not furnished when the machine is arranged for a direct connected variable speed motor.

The Feed Mechanism

The feed mechanism is driven from the drive shaft through hardened steel bevel gears, and is housed in the column above the speed mechanism. It consists of two friction clutches and a jaw clutch. The friction clutches are immersed in a bath of oil, the end thrusts being taken by S. K. F. ball bearings. By engaging one of the friction clutches the spindles are rapidly advanced until the drills come in contact with the work, at which point the jaw clutch is automatically engaged to feed the drills through the cut. When through the cut the other friction clutch is automatically engaged to effect a quick return of the spindles to the starting position. The levers operating these clutches are interlocking, which prevents the possibility of more than one clutch being engaged at the same time. With this system of feeds, work having obstructions above the drilling plane, which the drills must clear when in a raised position, is accomplished with a minimum loss of time. Feed changes can be made by merely removing a gear case cover and changing two gears.



GENERAL APPEARANCE OF THE MACHINE.

The Feed Screw

The feed screw is large in diameter and of substantial pitch. It is operated by the feed mechanism through a vertical drive shaft and a train of spur gears. The threads on these screws are engaged by a hard bronze nut, which is immersed in a bath of oil and located low in the spindle head to prevent the threads from being exposed when the head is fed to its lowest position on the column. The advantage of this screw feed, which is located directly above the work, lies in obtaining an absolute vertical feed-thrust in central alignment with the spindles, thereby eliminating all side thrust to the spindle head and column ways and maintaining them in their original true alignment for a long period of use. End thrusts on this screw are taken in both directions by large S. K. F. ball bearings.

The Spindle Head

The spindle head is a substantial casting of box construction and is securely gibbed to the column by a square lock method. This head supports the spindles and retains the spindle drive gears. Each spindle, when arranged to be adjusted, either universally or in a straight line, is connected to the drive gears by a telescopic drive shaft fitted with universal joints. When the spindles are arranged

with fixed centres they are connected with the drive gears in a more direct manner without universal joints. The universally adjustable spindles are supported by substantial brackets, which are fastened in two "T" slots to a planed flange located at the lower end of the spindle head. Straight line adjustable spindles are supported by L-shaped brackets which are fastened to a cross-rail. The thrusts on all spindles are taken by S. K. F. ball bearings.

The Table and Column

The table and column are cast of a close-grained gray iron, and are of sufficient weight to ensure rigidity. The table can be furnished in either a knee or box type. The knee type is gibbed to the column by a square lock method, and is adjustable vertically. This adjustment is obtained by means of a crank lever, which, through a spiral gear mechanism, actuates a heavy jack-screw. The box type table is made with its top surface provided with "T" slots, to which the work or a jig can be clamped. The bottom part of this table is fastened to a planed surface on the base, which is also provided with "T" slots.

The Oiling Method

The oiling method—consisting of a force feed, gravity flow and splash system combined—is made possible by the all-enclosed unit construction. The speed and feed mechanisms taken collectively, and the spindle head separately, are each provided with independent and self-contained oiling systems which ensure positive lubrication, and, as a consequence, economical maintenance. Each of these units are tightly encased and partially submerged in a bath of oil, while the bearings are lubricated by a force feed through individual leads which carry a sufficient flow of oil to flush all enclosed parts on its return to the reservoir.

Extra Attachments

Extra attachments, such as hand-feed for the spindle-head, motor drive, holding fixtures and tools, and equipment for cutting compounds or lubricants, including pump, tank and pipe fittings, can be furnished, but are not included in the regular equipment of this machine.

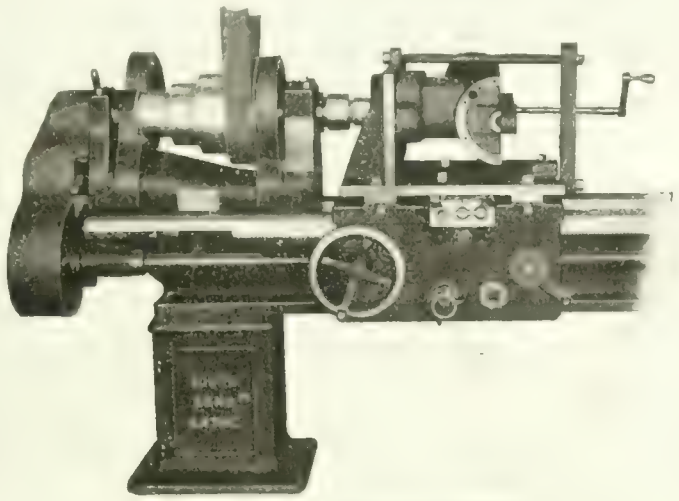
Following are its Principal Specifications:

Capacity	Eight ¾" holes
Minimum distance center to center of spindles	2"
Maximum distance center to center of spindles	22"
Vertical adjustment of collet in spindle	¾"
Diameter of spindle nose	1 31/32"
Morse taper in spindle	No. 3
Diameter of joints	1¾"
Maximum distance nose of spindle to base	44"
Minimum distance nose of spindle to base	30"
Maximum distance nose of spindle to table	32"
Vertical travel of spindle head	14"
Distance center of spindle to column	9.970"
Table—vertical adjustment	12"
Table—working surface	20" x 36"
Back gear ratio	1 to 2
Spindle speeds—six	110, 137, 172, 220, 275, 344 R.P.M.
Electric motor—speed variable	500 to 1500 R.P.M.
Width of belt used	4"
Feeds—change feed gears to suit character of work	

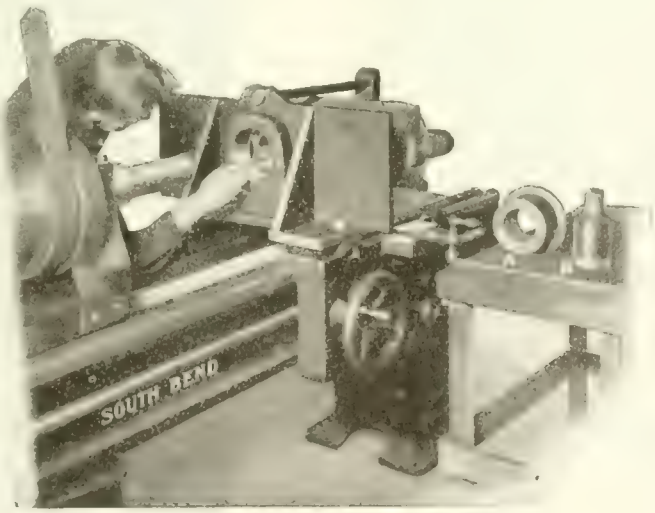
Any further information on this machine can be secured from the makers, the Defiance Machine Works, Defiance, Ohio.

SOUTH BEND CYLINDER-BORING ATTACHMENT FOR LATHES

The South Bend Lathe Works, 425 East Madison Street, South Bend, Ind., has just placed on the market an attachment by means of which any of its lathes can be quickly set up for reboring the cylinders of automobile engines. The illustration shows the attachment in place on a 21-in. lathe, but the device is applicable to all lathes of 15 in. or larger. In putting the attachment in place, the compound rest is removed from the saddle, the jib being secured in position by means of two taper pins and bolts fitting the T-slots in the carriage. A feature of the device is the method of locating the work. There is a hole in the attachment in line with the lathe spindle. This hole is fitted with a removable bushing which is in its turn fitted with a plug, on the end of which a shoulder is turned of the same size as the cylinder bore. This bushing and plug are put in place with the end of the plug projecting through. The cylinder is placed over this plug and clamped in place, after which the plug and bushing are removed, allowing the work to be done. The boring bar fits into the taper of the lathe spindle and is provided with a cutting tool that will bore holes from ⅛ to 1 in. in diameter and can be adjusted to the thousandth of an inch. If larger cylinders must be rebored a collar can be fitted in the end of the boring bar to hold cutters of larger size. The attachment is said to be of great value where cylinder boring is only done occasionally as it can be easily put in place or removed from the lathe.



GENERAL VIEW OF THE FIXTURE.



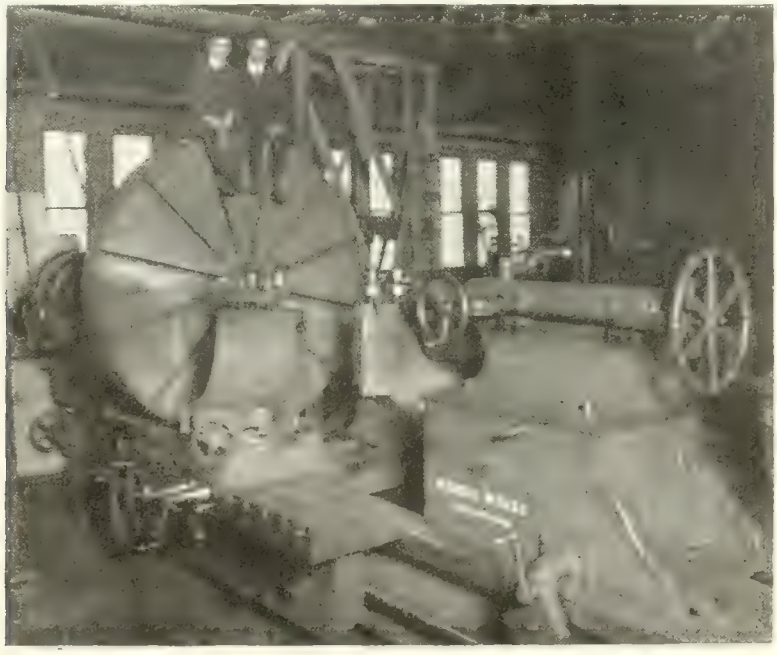
CLOSE UP VIEW OF THE FIXTURE

A most ingenious little night lamp has been introduced by an American manufacturer of fixtures. This device is made of porcelain, and of an odd shape strongly suggesting a Japanese type of lamp. The shade is made an integral part of the base. In the base is a step-down transformer, which reduces 110-vole alternating current to 6 volts, so as to furnish current for a six-volt two-candlepower automobile type bulb. A simple switch is provided for turning the light on and off.

This little night lamp furnishes just sufficient illumination for dimly lighting a medium-sized room, and the bulb is properly shielded so as not to be troublesome. The current consumption is so slight as hardly to make the average meter register.

96 IN. FIFIELD ENGINE LATHE

What is said to be one of the largest lathes in the world, a 96 inch swing triple-geared Fifield, has just been produced by the Wright Works, 1150 S. Washtenaw Avenue, Chicago, Illinois. The machine is depicted in Figure 1, which shows a front view of the lathe with faceplate removed. The machine is cone-driven from a backshaft, this procedure being necessary to obtain enough power to take the heavy cuts which a device of this size would be subjected to. An eight-inch belt from a countershaft running at 200 r.p.m. transmits forty horsepower to the spindle of the lathe. To reduce chattering, the spindle is made of cast iron. The theory of using cast iron is that it is less elastic and therefore will not spring on heavy cuts and thus reduces chattering. To compensate for the strength of the steel spindle the spindle is of generous proportions, the front bearing being 16 in. diameter and 24 in. long and the rear bearing 14 in. diameter and 20 in. long.



GENERAL APPEARANCE OF THE LATHE

The lathe is triple geared and all changes are obtained by moving the hand-wheel, which is conveniently placed in front of the cone pulley, thus making all changes within easy reach of the operator. The handwheel is geared to a lever shaft, which reduces materially the effort required to shift the back gears into their desired positions. Only one of the changes is through sliding gears, the balance being by means of massive tooth clutches. The gearing and cone pulley is designed so that all speeds are in geometrical progression, the slowest speed being 0.75 r.p.m. and the fastest speed 76 r.p.m. Twelve speeds are obtainable through the four steps cone pulley and triple gearing with a ratio of 1.52 between each speed. All of the gearing in the headstock, as well as throughout the machine, are made of steel and the pitch and width of face gears increase in proportion to the load which the teeth have to stand in reducing the backshaft speed to turn the faceplate at the slow speeds required when turning large diameters. The triple gear which engages the faceplate internal gear is of one diametral pitch and has a face width of six inches.

Every shaft in the headstock runs in phosphor bronze bearings and is well lubricated by means of sight feed oilers, which are in the operator's sight at all times.

The feeds are also in geometrical progression and are obtained from a quick change gear box, which is integral with the headstock. They are manipulated by means of the two levers shown in the illustrations, which move in either direction, giving four feeds of 0.025 in., 0.050 in., 0.100 in., and 0.200 in. per turn of faceplate. More feed may be had by changing the regular feed gears with the thread cutting gears. Twenty-four different threads may be cut by means of changing gears. All the gears are guarded by covers or guards, which are made conveniently removable where necessary, while the change gear guard is provided with a door.

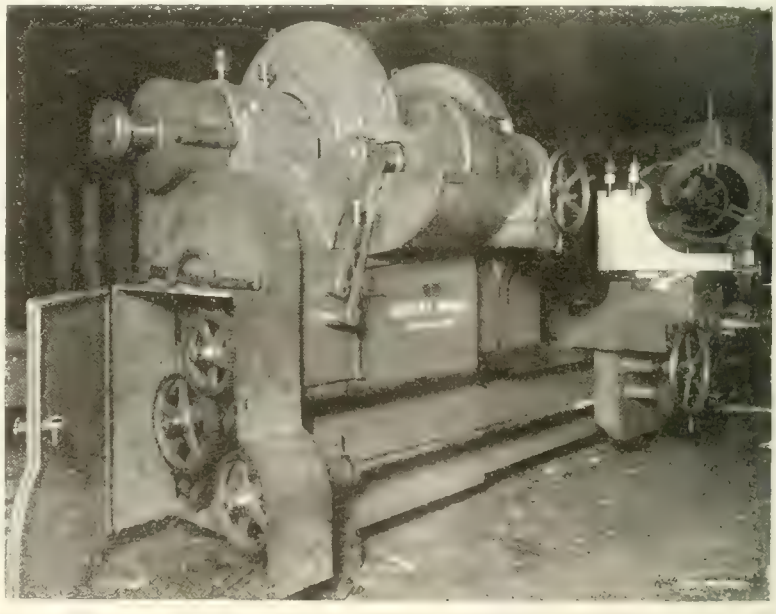
The carriage in the illustrations is equipped with two compound slides, which may be fitted with power angular feed at the request of the purchaser. The carriage bears upon the ways for a length of 90 in. The apron is made of steel gears and is bush throughout.

The lead screw is kept from buckling by means of supports, which are adjustable and placed at about ten feet apart.

The tailstock, like headstock, is of box construction and is moved easily by hand by means of a geared device, which engages the teeth in the rack of the bed. The tailstock spindle is moved by a handwheel, which is placed convenient to the carriage.

A massive steady rest is supplied with each and every machine.

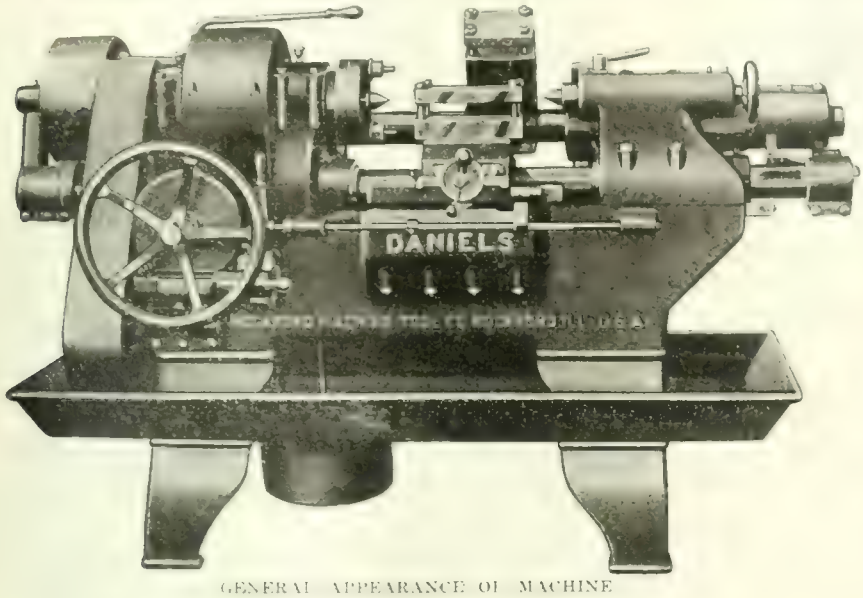
The bed is ribbed throughout with box sections and is fitted with a rack down a centre rib, which engages a pawl on the tailstock, removing the thrust of a cut from the clamps of the tailstock direct to the bed of lathe. The bed provided for the machine in the picture is 48 feet long and will take 34 feet between centres. The total weight of the machine is 150,000 lbs. An idea of the massiveness is furnished by Figure 3, which shows two men sitting on the faceplate.



ANOTHER VIEW OF THE MACHINE.

"DANIELS" AUTOMATIC LATHE

The automatic lathe illustrated, which is intended for the rapid production of duplicate parts in large quantities, is a recent product of the Rockford Machine Tool Co., Rockford, Ill. This machine was designed by Lee G. Daniels, and, while having only a 14-in. swing over the carriage bar, is said to be built on 22-in. heavy-duty lathe lines in order to withstand severe service. After being set up for an operation, the work, either centred or mounted on an arbor, is placed in the machine, the speed clutch thrown in, and the feed worm lifted into position; after which the machine goes through its operations and the tools return to their starting position.



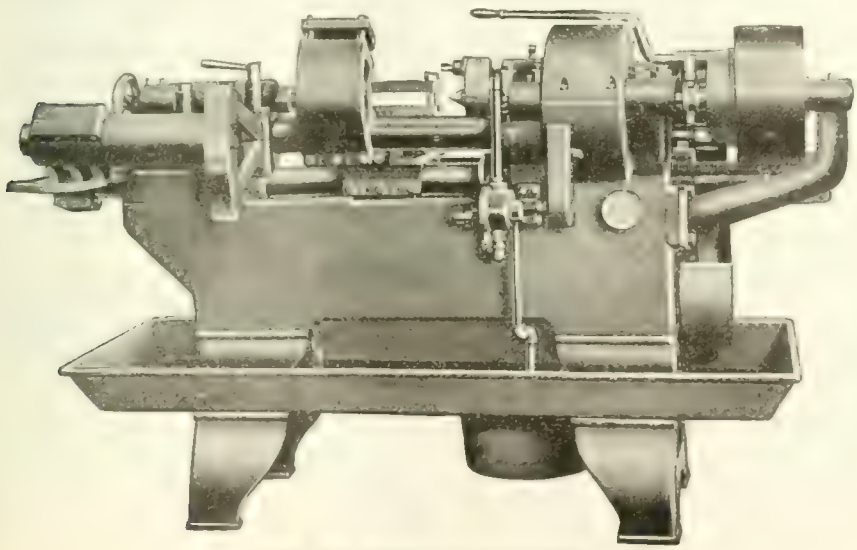
GENERAL APPEARANCE OF MACHINE

The side and right-angle carriages are arranged to carry multiple tools, the side carriage for turning different diameters and the right-angle carriage for facing and recessing. It is possible to use four or more tools in each carriage, all operating at the same time.

The machine is of the one speed and feed type. If necessary, change gears can be used to vary the feed, but it is necessary to change pulleys to alter the speed. The drive is to a friction pulley and then through a pair of helical gears to the spindle. The headstock is cast integral with the bed. A heavy steel bar bearing directly in the head and tail stocks serves as a support for the side carriage. This is solidly and permanently clamped to the bar. The carriage also bears on a hardened steel way at the front of the bed and when the feeds are tripped the carriage is automatically moved away from the work so that the tools will not drag in returning to the starting position. Special hardened-steel ways can be furnished to give the work taper, convex or concave form if desired.

The right-angle carriage is mounted on a bar supported in bearings in the head and tail stocks, a segment cam on this bar being actuated by a roller from the side carriage bar. The tailstock is of the four bolt type cast in one piece and fitted with a taper gib.

The bars for supporting both carriages are finished by turning and grinding from high-carbon forged-steel bars and are 3½ in. in diameter to insure rigid support for the cutting tools.



VIEW OF MACHINE FROM REAR.

A lubricating system is provided, the oil pump being driven by a chain from the clutch shaft. Flexible tubing for delivering the lubricant to the work is regular equipment.

"W & B" WRENCH BOARD

The Whitman & Barnes Manufacturing Company, St. Catharines, Ont., are putting out an attractive new board for displaying their drop-forged wrenches. The background is light golden oak, the display card is black with gold lettering.

The wrench board is designed to be of greatest assistance to both the dealer and the purchaser. Each wrench number is plainly marked in red. Wrenches may be had either semi-finished or black enameled finish. As the new board is only 8 inches wide by 28½ inches high it may be used to advantage in the window as well as in its more usual location or store column or walls.

The assortment of ten sizes of double head wrenches, three of each size, is not intended to be complete or to take the place of the dealer's regular stock. It does, however, include the most popular sizes for general use, and so serves as a guide to the purchaser as well as a silent but effective salesman and stock-keeper for the dealer.

GENERAL APPEARANCE OF THE BOARD.

A handy little booklet describing the new wrench board will be mailed to dealers on request.

The MacLean Publishing Company
LIMITED
(ESTABLISHED 1887)
JOHN BAYNE MACLEAN, President. H. T. HUNTER, Vice-President
H. V. TYRRELL, General Manager.
PUBLISHERS OF

CANADIAN MACHINERY
AND MANUFACTURING NEWS

A weekly journal devoted to the machinery and manufacturing interests.

B. G. NEWTON, Manager. A. R. KENNEDY, Managing Editor.
Associate Editors:
W. F. SUTHERLAND T. H. FENNER J. H. RODGERS (Montreal)
J. H. MOORE.

Office of Publication, 143-153 University Avenue, Toronto, Ontario.

Vol. XXII. TORONTO, October 2, 1919 No. 14

PRINCIPAL CONTENTS

Manufacturing the Hall Line of Pipe Machinery	337
Description of Mahr Calorizor and Furnace	341
Nichrome Castings for Heat Treatment	343
Special Announcement on Drafting Course	345
Canadian Machinery Drafting Course—Part 1.	346
Welding and Cutting	349
What Our Readers Think and Do	352
Developments in Shop Equipment	354
Editorial	358
Market Developments	360
Selected Market Quotations	78
The Small Town That Advertised and Became a City	80A
Industrial Developments	80H

The Good-will of the Men

WHY is it that there are some of the steel mills of United States running 100 per cent. to-day, while others were shut up tight the first day of the strike?

Now there is no chance work about this. Organizers and strike leaders are just as eager to tie up one mill as another, although it is a fact that the strike is aimed primarily against the Steel Corporation.

At Vandergrift, for instance, the strikers made no headway. George McMurtry was at the head of this mill long before it went into the Corporation. He made a study of men. He wanted to make life pleasant for them. His men were greater to him than the steel they were to turn out.

At Middletown, the home of the American Rolling Mills, the influence of such a man as George M. Verity is seen in the present crisis. That mill is running and chances are that it will continue to run. That mill is managed not for the one purpose of turning out a product that is recognized as par excellent, but it is run in such a way that to turn out anything else would cause the men to feel guilty of wounding a friend in his own house.

When is industry going to learn this lesson?

Contented workmen will turn out a good product. Men who are on the "edge" all the time will not.

The successful manufacturer to-day is out to buy more than eight hours of a man's time. If his interest in the human element in his establishment begins and ends as the men pass in and out by the time clock, he is going to get a very perfunctory service. He is not going to have an organization that will stand behind him in spite of all that strike-agitators can do.

Don't say that it cannot be done. Do not take refuge in the experience of someone who has made a half-hearted attempt.

Men are still men. They can be appealed to as such. They can see when a firm comes to them on the "dead level," and they have also learned to look a gift horse in the face.

You cannot run your shop on the card-index plan. A man must be something more than a number on a card or a necessary load on the pay roll.

Do you know your men? Do you know anything of their living conditions? Do you know if they are up against a big load in the way of sickness or hard luck?

You say you have too many to know in this way. Then that is all the more reason to set at this work systematically.

There are Canadian manufacturers who know their men. They can get out in the shop or the mill and call most of them by the first name. Do they lose prestige? Do the men get too familiar? Not much! These men are having a good time every day, and at the same time they are wisely practising a commendable sort of self-preservation.

I Don't Know

THE superintendent of a fairly large shop in a Canadian city went to one of the mechanics not many days ago. He said, "We need a new key-seater in this shop. What make would you advise?"

That mechanic did not have to spend a cent to have all this knowledge at his tongue's end. The firm placed a number of mechanical papers at the disposal of its men. All that was necessary was to apply at the circulating library.

Right then was his chance to have told the superintendent what he thought. He should have been able to tell him what he preferred and why. He knew the class of work done in the shop; knew what was necessary, but—

He said: "I don't know."

And right there he passed up a chance to become an authority on what was good shop equipment.

The superintendent was in quest of information. He was out to find a mechanic who recognized that this is a day of machine production—a day when shops must have the machine suited to their work.

He wanted to know which was THE machine for their plant, and why.

Now it was quite natural that he should go out and ask a mechanic in his own shop. The superintendent may have had something else in his mind, for promotions come at the most unexpected moments.

But that mechanic, at the first test, in the first round, passed along his chances when he said: "I don't know."

This is the day when the man who is going to the top of the heap will be able to say: "We need this make of machine. It will do the work here because—" and then he goes on to tell why.

The advertising and new equipment pages of a paper like CANADIAN MACHINERY are full of the newest developments in the machine tool field. They are an education to the mechanic who is bound on getting into the "I know" class. They are a sealed book to the "I don't know" mechanic.

The "I don't know" list is a long one. It has few men who can reach very far through the cashier's wicket on pay day. The "I don't know" chap has only 44 or 48 hours of his time for sale each week. He has nothing else of value to his firm.

The "I know" man is in demand. He has his skill plus his information on up-to-date equipment and methods.

If you want to enter the field of larger service, get away from the monotony of production—get in the "I know" class. It is entirely a personal matter. No one else can do it for you, and no one can keep you from learning.

Is There To Be No Limit?

THE United Mine Workers of America, at the Cleveland session, state their programme as follows:—

> Sixty per cent. increase in all mine wages.
> A limit of six hours upon the day's labor underground.
> A five-day week, with time and a half for overtime, and double time for work on Sundays and holidays, and important improvements in conditions of labor.

If these demands are not met the miners will strike on November 1.

The sixty per cent. increase in pay and the decreased hours of labor mean easily a hundred per cent. increase in the price of coal.

Readers may at first be inclined to take these demands with some degree of levity, but there is the utmost seriousness in the presentation of the demands, and in the whole proceedings.

This continent needs coal—needs a lot of it, and needs it right now. The miners propose to stifle production and enormously increase the cost.

They propose to saddle every worker in Canada and United States with a load that he cannot carry and decently exist.

The strike, as a legitimate weapon, is being abused beyond words. There have been times, many of them, when a strike was the only thing to which labor could turn and maintain any reasonable degree of self-respect.

The continued resort to the strike by men who have not a large enough grievance to warrant this extreme measure is making the phrase "they've gone on strike" a word that arouses little sympathy and less support.

President Tom Moore, of the Trades and Labor Council of Canada, at the Hamilton convention, had this to say:—

"A number of leaders of labor and those who follow them have been repeatedly warned of the economic danger of too frequent or too wide a use of the strike weapon. They have been told that it is inimical to production and to the best interests of the nation, and so will ultimately rebound upon themselves. They have not, however, been sufficiently warned of the danger they run of spoiling their final and best weapon of defense by its too great use and by attempts to force by its means decisions that such a weapon ought never to obtain."

The very word "strike" is being stripped of its real meaning, and robbed of its strength in portraying to the mind the idea of a struggle of the weak against the strong.

The wise labor leader cannot afford to take "the public be damned" attitude. The public in the last analysis hold a tremendous amount of power that they have never yet exercised, but it looks as though it might be necessary to organize and harness some of this power for the purpose of protecting the great mass of the community—the common people.

Back to the Stone Age?

HERE is an item from the "society" columns of a Toronto newspaper:—

> "Five hundred dollars was paid for an evening cloak and four hundred for a gown one day this week by a well-known Toronto woman."

The chances are that had the paper inserting this paragraph thought seriously about present-day conditions, about the volcano of unrest on which we are sitting, or of the things men and women are thinking about and saying, the paragraph would never have found its way into print.

There was a time when people took it for granted that it was all right for some people to have all they needed, and more, while others had not enough to keep body and soul together.

During the days of the war much was said of the breaking down of class lines, of the levelling of the people to the plane of service and sacrifice. In fact, were one to have taken seriously all that was said, it would be reasonable to expect that we should now be in an era quite different to that before the war.

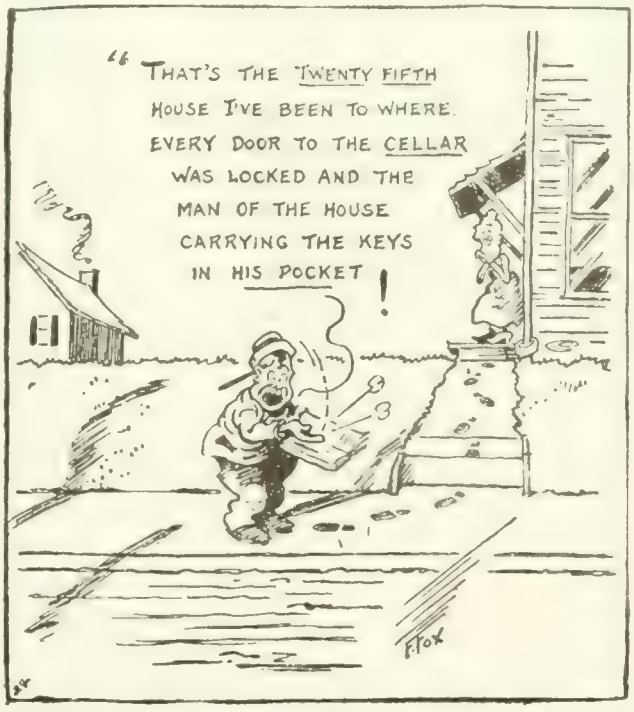
But that was a war-time dream. The sacrifice was made, but the selfishness returned. It is here to-day. It crops up all over and will not be downed. The pursuit of dollars is once more the centre and circumference of man's life.

And so we have this vulgar display of wealth again. Oh, yes, it is interesting to read of $900 being paid for a gown and an evening coat! In fact it might be more so were it not a fact that one can see women with market baskets going to butcher shops and stalls looking for cheap cuts of meat, and turning away again with empty baskets because there happened to be no cheap cuts on that day.

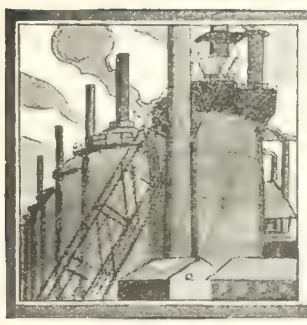
This old world is in the melting pot, and the outpouring has not yet come to pass. Nor are we going to have the dross skimmed from the gold by the poor vaporing of the social columns of the daily press, where some censor has the job of selecting the social sheep from the unfortunate herd of goats that have committed the awful crime of not being wealthy.

It is a fact that this old world hungers for love, for the handclasp that has a heart-throb behind it, for genuine worth stripped of its trappings, and for manliness that is saturated with integrity and honor.

All things that make for the bringing to the surface of these attributes are worthy of our greatest encouragement, while everything that, in these times of uncertainty and unrest, tends to build anew class lines, emphasize social distinctions, or place dollars above character is unworthy of a place in the thought and acts of serious-minded men and women.



THE METERMAN IN A DRY LAND.
—From the Youngstown (Ohio) "Telegram



MARKET DEVELOPMENTS

The Steel Strike Touches Canadian Markets

Firms Using Much Material May Have to Pay Higher Prices—New York Reports That Machine Tools Are on the Level of the War Period and in Some Cases Higher

HOW long can Canadian industry stand the steel strike in United States? That question is concerning a lot of people just now. There are plants that will be touched very quickly, while there are others that will not feel the pinch for weeks yet. On a broad basis, though, it can be accepted as a fact that it is not possible for industry on this side of the line to prosper while the same business across the border is in the throes of a desperate strike.

The strike came at a bad season of the year for Canadian business. Warehouse stocks are very low in many lines. Roughly speaking, plates, tubes and large structurals are the lines that we must import, and there are certain gauges in sheets that are much in demand, with only a limited production capacity in Canada. Buying from warehouses has been very brisk for several weeks, in anticipation of strikes, with the result that these places are pretty well cleaned out.

Prices will be firm and higher on many lines. One user of sheets, for instance, who wanted 20 tons, found that by the time he had made the rounds of several houses to secure his requirements, he had to pay $400 more than he figured on. Although the actual lists may not be altered, the chances are that premiums will be secured on a good many lines where there is any chance of delivery.

It might be supposed, at first glance, that Canadian steel mills would benefit largely from the strike. They may for a short time, but not in the long run. For instance if a factory cannot secure plate, it will be only a matter of time before it will be closed off, and out of the market as a buyer of those lines the Canadian mills are in a position to ship.

TROUBLE IN ENGLAND WILL HURT OCEAN SHIPMENTS FROM CANADA

Special to CANADIAN MACHINERY.

MONTREAL, Que., October 2.—In addition to the uncertainty that has followed the inauguration of the steel strike in the steel districts in the States, the action of the railway men in Britain has added to the unsettled condition in this district. Not that the situation here has been directly affected, but the consequence of these disturbances will eventually be reflected throughout the industrial world. The immediate result of the strike in England will be to create a congestion at ocean terminals that will cause the Government to place a virtual embargo on imports and exports. Already the ports in the Old Country are unable to take care of the material that is accumulating, and restrictions are looked for every day that will curtail the activities until the situation can be relieved. Officials at the port here are looking for some action that will call for revised regulations in regard to shipping to British ports.

Strike Shows Little Effect So Far

Despite the fact that the steel strike in the States is casting a cloud over the activities in this district, the business here has shown no outstanding developments as a result of the unsettled state prevailing in the American steel centres. The conservative attitude that has been only too pronounced during the past few months has become additionally emphasized during the week just passed. The present demands, however, are not of a character that activities would be suspended in consequence of the close-down of the United States mills. It is learned here, that, apart from the heavier classes of materials, such as plates and large shapes, the requirements of the trade can be supplied from the Canadian mills, or stocks that are in the hands of dealers. In some respects the strike has been foreseen, and many consumers have protected themselves by covering their requirements for weeks ahead. This, with the light volume of present business, will assist in tiding over what would otherwise be a serious situation. So far there has been no alarming conditions here as the mills have been able to supply all the needs for immediate demands. Should the strike extend for a long period the effect would be first felt in plates and shapes, and the demands for this material here is very light at present. While it is impossible to predict what will eventually take place, the trade here is quite optimistic, and many believe a settlement will be reached within a very short time. However, should the present trouble spread, the market would undoubtedly strengthen and price quotations would likely advance. Dealers here are holding to current quotations and do not anticipate an advance unless a serious turn develops across the line.

Metal Showing Weakness

The metal situation here has felt the effect of the unsettled condition now prevailing in the States, not in a direct way, but consumers are adopting cautious methods until affairs become more stable. The demand has shown a slight falling off, and as a result dealers are quoting weaker prices on all the metals. Copper is now quoted at 25½ for lake, and 25 cents for electro and castings. Tin is down 1 cent, and the price asked is 59 cents per pound. Spelter is now 9½, this being a decline of ¼ cent on the week. Antimony shows a similar decline and is quoted at 9¾ cents. Aluminum is lower and the quotation of 33 cents represents a decline of 2 cents per pound.

Little Scrap Movement

Dealers here are closely watching the developments across the line, but the effect so far has only been one of passive interest as the market here has not been affected by the tie-up of the producing mills. It is difficult to state what will

take place should the strike continue for any length of time, and it is hard to get any dealer to commit himself in this connection. The feeling is general that the strike will be of short duration, and for this reason the dealers are reluctant to speculate on the market. They are willing to let present prices stand for another week.

MUCH INTERESTED IN STEEL STRIKE

Canadian Firms In Some Lines Must Secure Their Supplies From U. S. Mills

TORONTO,—The strike in the steel mills of the U. S. is the big cloud on the horizon this week. Warehousemen want to know how they are going to make out. Firms that have orders in the U. S. mills at the present time want to know what chances they have of getting deliveries from them, and the firm that wants plate rolled to keep the shops going are keen for any intimation of how serious will be the curtailment of output at the mills.

So far the strike has not hurt this country. But it would be folly to say that Canada is going to be free for any length of time. Indications point clearly to the fact that if the trouble continues, this country is going to be seriously affected.

How It Works Out

The Canadian steel mills should get a larger tonnage of material than they are capable of handling. If they are in shape to handle much more is not certain. For instance, one firm—an American concern that is putting a branch in Canada in the Windsor district—was going to buy 50 tons of sheets. The order in the natural course of events was going to be placed at the U.S. mill where the parent concern had been securing material for some years past, and in the use of which they were accustomed. There is some urgency in the order, and it will go to a Canadian mill. There is no reason to suppose that this one case will not be duplicated many times.

How the Stocks Stand

Warehouses report that their regular supply of plates has been largely shut off, although there are some deliveries coming through yet. That is to be expected as there would be a large amount of material practically ready for shipment, and some of it actually on the way when the strike started, and of course, there are mills that are making shipments even yet.

There is very little plate in the warehouses of this country, and the fact that there has not been very heavy buying is responsible for this. Jobbers preferred to do an import business and pass on orders for mill shipment rather than stock heavily in a rather uncertain market. During the past few weeks when it seemed probable that there would be trouble in getting material from the United States mills, there has been a run on the warehouses carrying wanted sizes and gauges, and so it is that plate stocks in the warehouses are low—very low in fact, with very little prospect of getting them replenished for the present.

It would not be surprising were prices to stiffen at once. For some time past there has been more or less juggling with the prices of plate, which has been the weak spot in the whole steel list. Business, while nominally at 2.65, has in many cases been going across at 2.50. The strike situation will no doubt take care of this tendency, although the selling agencies of the mills state that they do not intend to enhance prices on the strength of the strike.

The Case of Sheets

The case of sheets is different, as this is an article that has some capacity in this country. There is no guess-work in sheets, though, because they are going to go up. In fact, they have already gone up. Just who to blame for this order of things is hard to state. It is a question much the same as who is the greatest offender, the man who takes or gives a bribe. Very often the purchaser, finding that his plant is very much in need of a certain line, will pay a premium for delivery, in which case the seller is relieved of the embarrassment of approaching this rather delicate question.

But here is a case in point. One Ontario firm wanted 20 tons of sheets, and they were very anxious to get them. That twenty tons is costing the buyer, by the time that several warehouses have contributed their quota, something like $400 more than the former price which was good up to a few days ago.

There are not many galvanized sheets in several of the warehouses, and prices vary a little on these, while the chances seem to be that, with black sheets, their raw material, going to a higher level, the galvanized product will move in the same direction. Sheet stocks are very low at the moment. This is due to the fact that there has been such a rush for sheets in the last couple of weeks that the warehouses have been brought down to very little to choose from. Many of the orders coming in are for No. 10 gauge, and for this there is little capacity in Canada, one mill in Nova Scotia alone being able to do this up to a limited sized strip. This is in reality a thin plate, and is used largely for smoke stacks, tanks, etc.

Tubes Not Plentiful

The strike has found the stock of tubes in Canadian shops and warehouses "shockingly low" as one of the sales managers put the case to CANADIAN MACHINERY this week. They are low in sizes and qualities, because there has been a very heavy demand. In this case there is no reason to doubt what prices are going to do. Already there has been a ten per cent. increase announced by the larger warehouses on the other side of the line. Two, three and four-inch tubes are wanted in this country, but they are not to be had with any degree of certainty or freedom in regard to the quantity ordered.

It looks as though the strike had come at a bad time for the Canadian warehouse trade. CANADIAN MACHINERY knows that there are large orders across the line, as warehouses had decided in several cases to stock up ready for whatever uncertainty might come in the winter months from transportation problems. Deliveries are not coming through against these orders, and as a result, they have little to offer their customers.

Doing a Good Business

Dealers in machine tool supplies report that they are doing a lot of business, and that it is well distributed, taking in a large number of industries.

And while speaking of small tools, such as certain makes of drills, one Toronto dealer remarked to CANADIAN MACHINERY this week: "This is a line that no person seems to be making money out of. I know for a fact that the man who sells them is now doing little more than breaking even in many cases, while it hardly seems likely that the makers are showing a decent profit. There has been too much competition and cutting to meet local and special conditions. I wish the makers would have some understanding, for as matters stand at present there are cases where the customer is actually in a position

POINTS IN WEEK'S MARKETING NOTES

New York reports that there have been several increases announced in the price of standard tools, and that in many cases the prices are now even above those that prevailed during the war period.

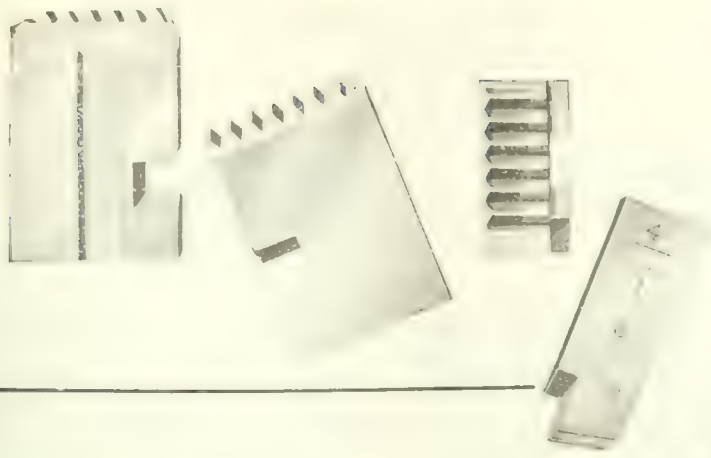
Canadian manufacturers using much material that is imported from U. S. steel mills report that in most cases they have enough stock on hand to last them for some weeks to come. They admit that if the strike is continued for any great length of time, however, matters will be serious for them.

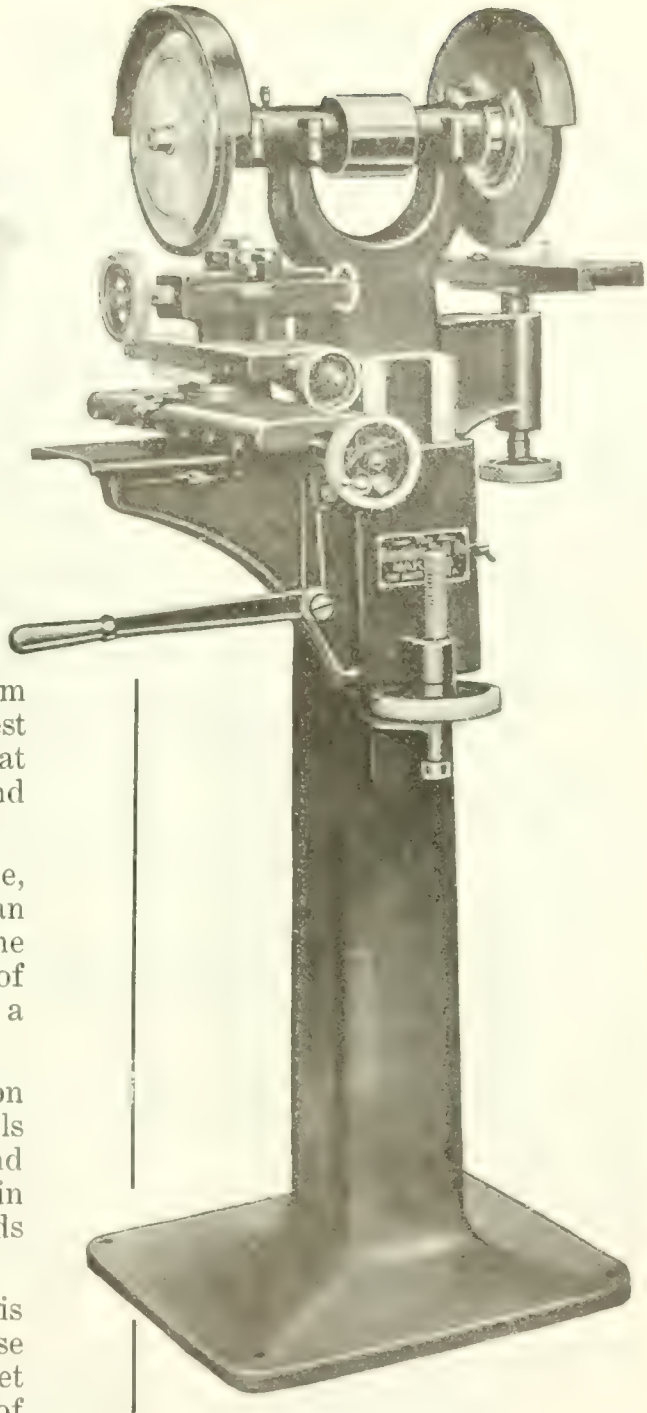
Pittsburgh reports speak hopefully of the strike in the steel mills falling through.

The steel strike is having its effect already on Canadian materials. Increased prices are reported on sheets, and buyers are in some cases willing to pay premiums for delivery.

A new list is out on steel tubes, showing increases. The stock of tubes in Canada is particularly low at present, especially in two, three and four inch sizes.

Montreal fears that the strike in England will bring out embargoes which will tie up ocean shipping.





Sharp Chasers Cut Clean Threads

Accurate, uniform threads result only from dies which are maintained in the highest state of cutting efficiency. This means that chasers must be kept sharp, and ground uniformly.

Even if just touched up from time to time, the chasers respond splendidly, with clean threads. And with this machine — the Geometric Chaser Grinder—the matter of keeping threading tools up to scratch is a comparatively simple matter.

Various makes of chasers can be ground on this adaptable machine. The two wheels permit the easy grinding of both milled and tapped chasers. In addition, the plain wheel lends itself readily to various kinds of tool grinding.

Uniform grinding of a set of chasers is purely a mechanical matter through the use of adjustments which can be accurately set to govern the grinding of an entire set of chasers.

The Catalogue describing this machine is a mine of information on chaser grinding. Write for it

THE GEOMETRIC TOOL COMPANY

NEW HAVEN **CONNECTICUT**

Canadian Agents:

Williams & Wilson, Ltd., Montreal. The A. R. Williams Machinery Co., Toronto, Winnipeg, St. John, N.B.

If interested tear out this page and place with letters to be answered.

to name the price which he is going to give you his business."

It would not be surprising were something done along these lines, not with the idea of creating a combine to boost prices, but simply to put the whole business on a fair basis where all would be treated alike.

GET ON THE JOB

"Don't be an alibi artist. Get on the job," is the legend that is emblazoned on a signboard at the entrance to one of the big steel mills near Pittsburgh; and there are authentic reports to show that the honest-to-goodness American is getting on the job. "It is a case of America for the Americans with those fellows," said a steel man to CANADIAN MACHINERY. "What the majority of them cannot swallow is anything in the shape of dictation from so-called foreign agitators as to what they shall do. That has been a big factor in the present strike. The real American is from Missouri. Moreover, a good many workmen who own stock in steel concerns are getting a glimpse of the other fellow's side of the question. They realize that unreasonable labor unrest and agitation endanger their investment."

NEW YORK REPORTS SOME TOOLS EVEN HIGHER THAN IN WAR TIMES

Special to CANADIAN MACHINERY.

NEW YORK, October 2.—The effect of the strike in the steel industry upon machine tool trade has been to reduce the number of inquiries. On the other hand, a very fair amount of business, most of which has been pending for weeks, has been closed within the past week. The falling off in inquiries indicates that manufacturers in metal working lines will not make new plans until the outcome of the steel strike is definitely determined. A victory for the unions would be a severe blow to American industry, and, while no such result is expected, there is a degree of uncertainty in the outlook that will hold up business. What the steel companies now fear is that President Wilson may attempt to take a hand in the situation and suggest an arbitration commission. The steel manufacturers have nothing to arbitrate. The issue in this strike is clear-cut—it is a fight on behalf of right-thinking Americans against the despotism of labor leaders who are un-American in their ideals and aspirations.

The thorough publicity given to the revolutionary character of W. Z. Foster, secretary of the strike committee, and the statements of John Fitzpatrick, chairman, to a Senate committee that labor is aiming at the socialization of all basic industries, has focussed public attention upon the crisis in Governmental affairs that might come through a victory for the unions in the steel strike.

Among domestic buyers of tools in the past week may be mentioned the Dusenberg Motors Corporation, Elizabeth, N.J., now a part of the Willys Corporation; the Hendee Manufacturing Co., Springfield, Mass., manufacturers of motor cycles; the De Laval Separator Co., Poughkeepsie, N.Y.; the Sharples Separator Co., West Chester, Pa.; the Crown Cork and Seal Co., Baltimore, Md.; the E. W. Bliss Co., Brooklyn, and the Bessemer Gas Engine Co., Grove City, Pa.

In the export field there is considerable inquiry but not much buying. The J. G. White Engineering Corporation, New York, is placing orders against a $250,000 list for Switzerland. An export company is asking for quotations on about 100 or more tools for locomotive and car repair shops in South America, and a South American mining company, with offices in New York, has issued a list of about fifty tools.

Manufacturers of planers have advanced prices from 15 to 20 per cent. Practically all types of machine tools are now back at war-time prices, while a few are even higher.

Crane business is fairly good, and prices show a tendency to advance in view of the difficulties in getting steel that may result from the steel strike. The Phelps-Dodge Corporation, New York, is inquiring for twelve cranes; the Kennedy-Van Soun Manufacturing and Engineering Co., New York, asks for quotations on seven, and the Cerro de Pasco Mining Co., New York, is in the market for five. An export company, the Transcontinental Merchants, Inc., New York, asks bids on 50 triplex chain hoists for shipment to Japan. The Standard Oil Co., of New Jersey, has bought twenty-eight jib cranes for its plant at Rahway, N.J.

STEEL STRIKE NOT AS SERIOUS A MATTER AS AT FIRST ANTICIPATED

Special to CANADIAN MACHINERY.

PITTSBURGH, Pa., October 2.—The steel strike started out as a serious matter, but not altogether as serious as expected. For four days, or until Friday morning, September 26, the matter hung in the balance, whether the strike would spread or would recede. The information gathered together Friday morning showed positively that the strike was losing ground, proving conclusively that, barring accidents, it would be lost, and probably in a few weeks.

The character of the strike was determined the first day. The organization campaign, authorized at the annual convention of the American Federation of Labor at St. Paul, June, 1918, was under the auspices of 24 unions affiliated with the federation, these unions being of various crafts which had more or less employment in the iron and steel industry as a whole, but did not represent any large proportion of the men employed. Machinists, engineers, moulders, etc., are employed to an extent and their joining the unions and going on strike would cripple operations more or less. The organization campaign also took in common labor.

When the strike started it was at once disclosed that it was not primarily a strike of these skilled men at all, but of the common labor, and chiefly the foreign born labor at that. The latter struck practically 100 per cent., while of the American born common labor many were willing to work. Then two things occurred, making the influence of the strike more serious. Men who wanted to work were thrown out of employment because other men, needed for operating a plant or a department as a whole, were on strike, and men who were at work were intimidated by strikers and gotten out. For illustration, practically all of Youngstown was on strike by the end of the second day, but the Trumbull Steel Company, operating a steel mill and sheet and tin plate mill at Warren, a few miles distant, was in full operation. Strikers marched up the Mahoning valley to Warren and "get" the mill at the time of changing turns, the fresh turn not being allowed to go to work. The same thing occurred at Canton, the men from a striking plant marching to the Canton Sheet Steel Company plant, which was not on strike, and closing the mill.

By Tuesday night a low point in operations was reached. When the strike started, at 6 a.m. Monday, September 22, about 35 per cent. of the productive capacity of the iron and steel industry was thrown idle. Then a process began of the strike losing at places where it had started poorly, and of spreading where it had started well. By Tuesday night the idleness amounted to about 40 per cent. Then began a close watch of how things broke from hour to hour. As the Youngstown and Wheeling districts were down tight and the Monongahela Valley was working moderately well, while the rest of the Pittsburgh district was nearly normal, it was evident that if the Monongahela valley could continue operating the fact would break the strike in Youngstown and even Chicago and Gary, which were about two-thirds down, would eventually

feel the influence. Accordingly, the close watch was kept on the Monongahela valley. As it was chiefly a strike of common labor the blast furnaces were most affected, and the blast furnaces were also more vulnerable because the men have to work in the open. After Tuesday night the number of blast furnaces began to gain, but as there were losses elsewhere it was not a clear case, Chicago and Gary going down more and more, while the strike in Cleveland became practically complete. By Friday morning, however, as noted above, there was good news only and the swing was towards the strike waning. An important influence outside the Monongahela valley was that Tuesday and Wednesday there was a cleaning out of Bolshevists at Sharon, in the Shenango valley, 70 miles north of Pittsburgh. Nearly a hundred were gathered in. Then the intimidation that had gotten out many men in the valley in addition to those who had struck, ceased, and beginning with the resumption of one Shenango merchant stack at Sharpsville Thursday night, operations in the valley increased, although very slowly. This is counted upon to have a favorable effect upon Youngstown and the rest of the Mahoning valley, just over the state line in Ohio, where everything is still closed.

It is largely a matter of protection by the civil authorities. In Pennsylvania nearly all the county and municipal authorities have done well to preserve order, and the magnificent Pennsylvania State Constabulary, a perfectly trained body of mounted men, has worked wonders. Two of these men can take care of a moderate sized riot. In Ohio there is no state constabulary.

The issue of a strike is usually settled the first week, though the strike itself may last much longer. With the start this strike made, it could have no hope of success unless it continued to gain throughout the first week, but it gained only during the first two days. Wednesday it was suffering more losses than gains, and since Wednesday it has had losses only, and no gains. Barring accidents, it is lost to the agitators and won by the manufacturers, and not by the latter doing anything except endeavoring to keep the agitators from doing mischief.

Winning a strike and producing steel, however, are different things for the manufacturers. The test, in this instance, has not been the amount of steel produced, but the number of men willing to work. Men have been kept in employment at works when the efficiency of the plant was more or less diminished by departments not being uniformly manned, and production has not been in the same proportion as employment. Thus, if as estimated there was 40 per cent. idleness when the strike was two days old, that does not mean that actual tonnage production was 60 per cent. of normal.

Furthermore, assuming that there are no accidents or unexpected developments and the manufacturers have virtually won the strike, it does not mean that production will be fully restored in the near future. The strikers in some districts may hold out for weeks, perhaps many weeks, depending in considerable part how well order is preserved, for twenty per cent. of the men can often intimidate eighty per cent. of the men and keep them from working. At the best there will be a large loss of production and consumers of steel will be incommoded very considerably. There are stocks in buyers' hands, but the stocks are not large and are probably somewhat below normal. Buyers of steel products have displayed a fine feeling of sympathy for the steel producers and are indisposed to bother them about deliveries.

Of course, it is impossible to be absolutely precise as to the extent various producers are affected by the strike, but the following is a summary that cannot be far from the exact fact, dealing with conditions as they were at the end of last week: East of Johnstown, Pa., and Buffalo, N.Y., practically everything working. Cambria at Johnstown, closed tight, also Lackawanna at Buffalo and some of the merchant furnaces at Buffalo. Cleveland, down tight; Lorain, nearby, running full. In the Pittsburgh district, Jones & Laughlin Steel Company operating both South Side and Woodlawn works practically full, the remainder of municipal Pittsburgh operating above 50 per cent. Monongahela valley, the largest single section of the Pittsburgh district, lower part including Homestead, Duquesne and Edgar Thomson works of Carnegie running nearly full; middle part of McKeesport, almost full; Monessen, at upper end, both steel plants closed. New Castle, at foot of Shenango valley, operating almost full; Farrell and Sharon, near middle, operating little, but increasing; upper part, almost idle, but gaining. Mahoning valley, including Youngstown, down tight. Wheeling district, down tight, except a few mills running practically full. Calumet district (Chicago and Gary) almost down. The south running almost normal.

PIG IRON TRADE

The demand for pig iron thrives. Fear that deliveries may be away off on account of the strike is responsible for this.

Philadelphia.—Inquiries are coming for big tonnages. Some are from three to five thousand tons. In one other case the American Bridge Co. is reported to have asked prices and delivery on 25,000 tons.

Boston.—In the past week Boston dealers placed a tonnage of at least 14,000 for 1920 delivery. Largest buyers are makers of textile machinery.

New York.—It is hard to secure "right now" shipments of pig iron, and for this reason several big orders are now held up. Export business is poor, owing to exchange and shipping conditions.

Pittsburgh.—Prices of all grades of iron are more or less nominal at the moment, because there are no large sales going through to actually determine the values. Several merchant furnaces have been banked, due to the strike.

Buffalo.—Caution is the word in furnace circles here. Bookings for 1920 business are being discouraged.

Chicago.—Deliveries of iron are poor and a brisk demand exists for spot iron. Sellers having iron in transit have no trouble in cleaning out their stock.

New York.—The British Ministry of Shipping has handed over the former Hamburg American liner "Imperator" to the Cunard Steamship Company. The company have dry-docked the vessel and will refit her for their passenger trade between New York, Cherbourg and Southampton.

U.S. SCRAP METAL

Scrap metal trade is much curtailed. Strike conditions are causing a holding-up of shipments.

Chicago.—Buying and shipping of iron and steel is almost at a standstill, owing to the strike. Dealers have been told to stop shipments in many cases. Many grades are 50 cents weaker.

Boston.—For the first time in months heavy melting is accumulating at some plants. Steel rails are $1 down. The ordnance department are offering scrap steel.

New York.—Buying is pretty much on a hand to mouth basis, pending the outcome of the strike. The prices remain nominally the same.

Philadelphia.—The strike has killed the market. Mills will not buy, as they fear that deliveries cannot be made to their mills, and dealers do not want to take the chance either.

Pittsburgh.—The halt has been put to business here. Prices are only nominal, and some of the mills are asking suspension of contract shipments.

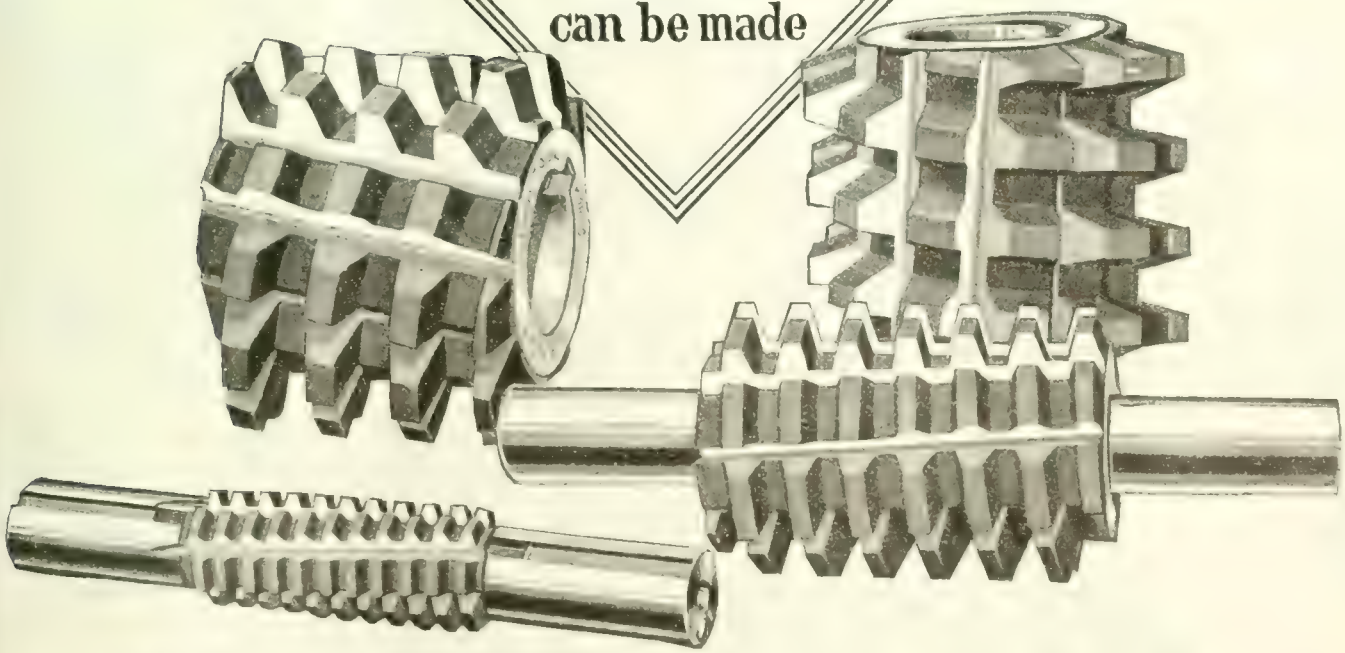
Look for Settlement.—One hundred moulders, employees of the Canadian Ingersoll-Rand Co., The Sherbrooke Iron Works, the E. & T. Fairbanks Co., and other plants walked out, demanding a $5 per day wage and other conditions. Some weeks ago the moulders made certain demands, chief among which was a nine-hour day with the same pay which they had been receiving for ten hours. This was granted by the employers, and the men went back to work. After this a meeting of the union was held and a strike vote taken. The officials of the companies stated that the walk-out would not tie up the production of the factories, and that they hoped for an early settlement.

ILLINOIS

HOBS

INDIVIDUALIZED BY ACCURACY, DEPENDABILITY AND LONG LIFE

None better can be made



ILLINOIS TOOL WORKS, CHICAGO.

Detroit Store
Woodward and Warren Aves.

A. C. Towne, Inc.
17 W. Swan St., Buffalo.

New York Office
141-145 West 36th St.

S. J. Pfaff
Pioneer Bldg., St. Paul.

Indianapolis Office
616 Fletcher Sav. & Trust Bldg.

Rose Tool and Supply Co.
111 Market St., Pittsburgh

Louis G. Henes
75 Fremont St., San Francisco.
Title Insurance Building.
Los Angeles

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	$27 15
Lake Superior, charcoal, Chicago	34 60
Standard low phos., Philadelphia	$38 00-40 00
Bessemer, Pittsburgh	29 35
Basic, Valley furnace	25 75
Toronto price:—	
Silicon..2.25% to 2.75%	$32.75 to $35.75

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	$ 4 25
Steel bars, base, Toronto	4 25
Steel bars, 2 in. to 4 in. base	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	3 75
Steel bars, base, Montreal	3 75
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in.	6 50
Chequered floor plate, ¼ in.	6 25
Staybolt iron	8 00
Bessemer rails, heavy, at mill	....
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh	2 45
Steel hoops, Pittsburgh	3 05
F.O.B., Toronto Warehouse	
Small sapes	4 25
F.O.B. Chicago Warehouse	
Steel bars	3 62
Structural shapes	3 72
Plates	3 90
Small shapes under 3"	3 62

FREIGHT RATES

	Per 100 Pounds. C.L.	L.C.L.
Pittsburgh to Following Points		
Montreal	33	45
St. John, N.B.	41½	55
Halifax	49	64½
Toronto	27	39
Guelph	27	39
London	27	39
Windsor	27	39
Winnipeg	89½	135

METALS

	Gross.	
Lake copper	$35 00	$26 25
Electro copper	25 00	26 00
Castings, copper	25 00	25 00
Tin	59 00	58 00
Spelter	9 50	10 00
Lead	7 25	7 00
Antimony	9 75	10 50
Aluminum	33 00	35 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ½ up	$ 4 50	$ 4 50
Plates, 3-16 in.	4 90	4 90

Price List No. 38

WROUGHT PIPES

Standard Buttweld

⅛ in.	$ 6 00	$ 8 00
¼ in.	4 68	6 81
⅜ in.	4 68	6 81
½ in.	6 21	7 78
¾ in.	7 82	9 95
1 in.	11 56	14 71
1¼ in.	15 64	19 90
1½ in.	18 70	23 76
2 in.	25 16	32 01
2½ in.	40 37	51 19
3 in.	52 79	66 94
3½ in.	67 16	84 18
4 in.	79 57	99 74

Standard Lapweld

2 in.	38 81	35 34
2½ in.	42 12	52 36
3 in.	55 08	68 47
3½ in.	69 00	86 94
4 in.	81 75	103 00
4½ in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

WROUGHT NIPPLES

4" and under, 60%.
4½" and larger 50%.
4" and under, running thread, 30%.
Standard couplings, 4" and under, 40%, 4½" and larger, 20%.

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds. Montreal	Toronto
Copper, light	$15 00	$13 75
Copper, crucible	18 00	18 00
Copper, heavy	18 00	18 00
Copper wire	18 00	18 00
No. 1 machine composition	16 50	16 75
New brass cuttings	13 00	10 75
Red brass cuttings	14 50	14 75
Yellow brass turnings	9 00	9 00
Light brass	7 50	7 00
Medium brass	9 00	7 75
Scrap zinc	6 00	6 00
Heavy lead	5 00	5 25
Tea lead	3 75	3 50
Aluminum	18 00	18 00
	Per Ton.	Net
Heavy melting steel	13 50	13 50
Shell turnings	7 00	6 00
Boiler plate	13 50	11 00
Axles (wrought iron)	20 00	20 00
Rails	14 50	13 50
Malleable scrap	15 00	17 00
No. 1 machine cast iron	20 00	18 00
Pipe, wrought	10 00	5 00
Car wheels	20 00	20 00
Steel axles	20 00	20 00
Mach. shop turnings	6 00	6 00
Stove plate	15 00	13 00
Cast boring	7 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ⅜" and less	35
Carriage bolts, 7-16 and up	15
Coach and lag screws	50
Stove bolts	65
Wrought washers	50
Elevator bolts	25
Machine bolts, 7-16 and over	40
Machine bolts, ⅜" and less	40
Blank bolts	25
Bolt ends	25
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	net
Machine screws, o. and fil. hd., brass	net
Nuts, square blank	add $0 75
Nuts, square, tapped	add 1 00
Nuts, hex., blank	add 1 00
Nuts, hex., tapped	add 1 25
Copper rivets and burrs, list less	15
Burrs only, list plus	25
Iron rivets and burrs	40 and 5
Boiler rivets, base ¾" and larger	$8 50
Structural rivets, as above	8 40
Wood screws, O. & R., bright	75
Wood screws, flat, bright	77½
Wood screws, flat, brass	55
Wood screws, O. & R., brass	55½
Wood screws, flat, bronze	50
Wood screws, O. & R., bronze	47½

MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws	50
Sq. and Hex. Head Cap Screws	45
Rd. and Fil. Head Cap Screws	20
Flat But. Hd. Cap Screws	10
Fin. and Semi-fin. nuts up to 1 in.	45
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in.	40
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	25
Studs	30
Taper pins	50
Coupling bolts	10
Planer head bolts, without fillet, list	10
Planer head bolts, with fillet, list plus 10 and	net
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	net
Collar screws	list plus 20, 30
Thumb screws	40
Thumb nuts	75
Patch bolts	add 20
Cold pressed nuts to 1½ in.	add $1 00
Cold pressed nuts over 1½ in.	add 2 00

BILLETS

	Per gross ton
Bessemer billets	$38 50
Open-hearth billets	38 50
O.H. sheet bars	42 00
Forging billets	51 00
Wire rods	52 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	$4 70
Cut nails	4 75
Miscellaneous wire nails	60%
Spikes, ⅜ in. and larger	$7 50
Spikes, ¼ and 5-16 in.	8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, ¼-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net

MISCELLANEOUS

Solder, strictly	$ 0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	50
Standard drills, all sizes	50
3-fluted drills, plus	10
Jobbers' and letter sizes	50
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	list plus 10
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	10 to 40
Canadian high speed cutters	net
American	plus 40

COLD ROLLED SHAFTING

At mill	list plus 5%
At warehouse	list plus 25%

Discounts off new list. Warehouse price at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28	$ 6 55	$ 6 25
Sheets, black, No. 10	5 15	5 25
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright.	8 50	8 00
Apollo brand, 10¾ oz. galvanized	....	....
Queen's Head, 28 B.W.G.	....	....
Fleur-de-Lis, 28 B.W.G.	....	....
Gorbal's Best, No. 28	....	....
Colborne Crown, No. 28.	....	....
Premier, No. 28 U.S.	....	7 75
Premier, 10¾ oz.	....	8 05
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

(Warehouse Price)

B

¼ in., $13.50; 5-16, $11.50; ⅜ in., $10.50; 7-16 in., $9.30; ½ in., $10.15; $13.00; ⅞ in., $9.60; ¾ in., $9.70; ⅝ in., $9.95; 1 in., $9.50; Extra for B.B. Chain, $1.20; Extra for B.B.B. Chain, $1.80.

ELECTRIC WELD COIL CHAIN B.B.

⅛ in., $16.75; 3-16 in., $15.40; ¼ in., $14.20; 5-16 in., $11.50; ⅜ in., $10.50; 7-16 in., $9.30; ½ in., $10.50; ⅝ in., $10.00; ¾ in., $9.70.

Prices per 100 lbs.

FILES AND RASPS

	Per Cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot, Arcade	50

BOILER TUBES.

Size.	Seamless	Lapwelded
1 in.	$27 00	$.....
1¼ in.	29 00	.....
1½ in.	29 50	26 00
1¾ in.	32 00	26 00
2 in.	31 00	26 00
2¼ in.	35 00	28 00
2½ in.	43 00	32 00
3 in.	48 00	40 00
3½ in.	.....	41 00
3½ in.	60 00	42 00
4 in.	75 00	56 00

Prices per 100 ft., Montreal and Toronto

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	22½
Palacine	25½
Machine oil, per gal.	36
Black oil, per gal.	16
Cylinder oil, Capital	62
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

BELTING—No 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES

Chesterman Metallic, 50 ft.	$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.6

BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod	0 34
Brass sheets, 24 gauge and heavier, base	$0 42
Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

Wool Packing

Arrow	25	Anvil	15
Axle	20	Anchor	11

Washed Wipers

Select White	11	Dark colored	09
Mixed colored	10		

This list subject to trade discount for quantity.

RUBBER BELTING

Standard ... 10% Best grades... 15%

ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	$42 50	$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	$10 25	$11 50
Sheets, 3½ lbs. sq. ft.	10 00	11 00
Sheets, 4 to 6 lbs. sq. ft.	9 75	10 50

Cut sheets, ½c per lb. extra.
Cut sheets to size, 1c per lb. extra.

PLATING CHEMICALS

Acid, boracic	$ .25
Acid, yhdrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulpuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulpate	.16
Nickel carbonate	.32
Nickel sulpate	.18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Xinc sulphate	.08

Prices per lb. unless otherwise stated

WELLAND SECTION

Small Town Advertised and Became a City

MANY cities in Canada can point with pride to phenomenal industrial growth. Once having started to expand, their development has continued, and assessment figures show constant annual increases, not only in property values, but in population as well. One of the most outstanding examples of the effects brought about by well-directed effort to secure industries, and through their agency, build up a strong industrial community, is demonstrated in the new city of Welland. This is the "baby city" of Ontario, and can well be termed the lustiest of all the youngsters of the municipalities. Welland was incorporated as a city on July 1, 1917, and is making prodigious strides to double the population for the next census. Geographically, Welland is particularly favored, and its unusual advantages, the greatest of which is cheap Hydro-Electric power, place this city in a class by itself. In addition to cheap power Welland possesses exceptional rail and water facilities, a combination that has helped materially in securing the large manufacturing plants for the city.

Welland Enters Upon New Era

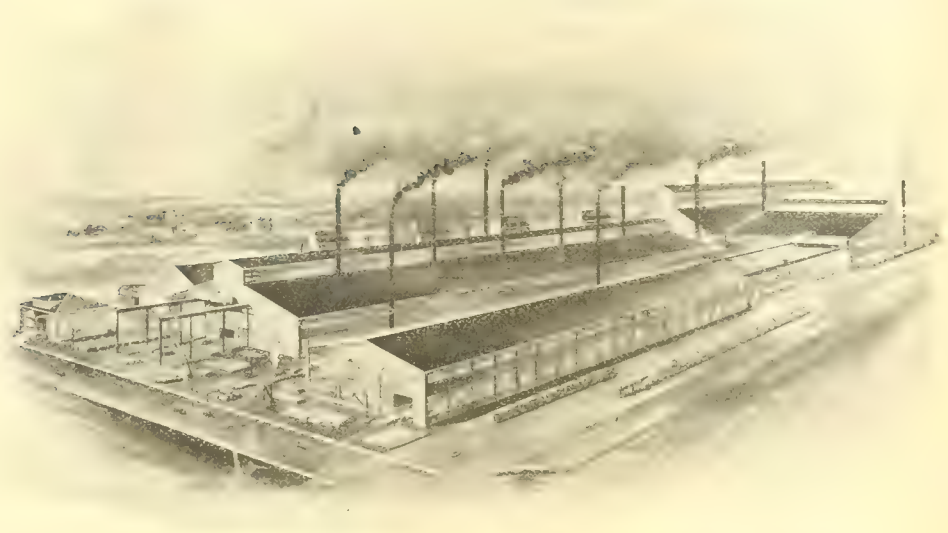
Welland's present importance as an industrial centre dates from 1906. This was the year of the coming of Hydro-Electric power. First came the Cataract Power Co. of DeCew Falls, to be followed later by the Ontario Power Co., and the Hydro-Electric Power Commission of Ontario. An American, B. J. McCormick, saw the wonderful possibilities that would follow the harnessing of Niagara power, and decided to devote his efforts to promote its interests in Welland. He became the first industrial commissioner, and to his energy and foresight must be credited the location of many of the largest factories in and around the city. In 1915 he was succeeded as industrial commissioner by Louis Blake Duff, who looked after Welland's interests in this respect until 1918, and was followed by W. M. German, who holds this position to-day.

From 1907 to 1917 Welland continued to grow. Its population ten years ago was only about 2,000. To-day it contains 8,825 people, its increase running about ten per cent. per annum. In 1906 the assessment was slightly less than a million dollars. In 1917 it amounted to $6,758,920. The industrial expansion has been equally striking. In 1906 the small sum of $150,000 would have covered the total value of Welland's manufactured products, and ten years later, in 1916, they had expanded to $19,375,115, and of this total only $5,500,000 represented munitions. The industrial payroll was but $50,000 for the entire year of 1906, and in 1916 it amounted to $3,610,336. The number of workers had increased from 100 to 5,000 in these ten years.

Railway Facilities

The railway facilities of Welland are equalled by very few places in Canada. Lines radiate from it in all directions. The Grand Trunk railway from Bridgeburg to Detroit, over which pass, in addition, the trains of the Wabash railroad, the Michigan Central's line from Buffalo to Detroit, also used by the Pere Marquette; the Toronto, Hamilton and Buffalo railroad, direct from Welland to Hamilton and Toronto; and the Grand Trunk Railway's line from Port Colborne to St. Catharines, all pass through or close to the city. The Canadian Northern system also has access through the Niagara, St. Catharines and Toronto Railway, an electric line, paralleling the Welland Canal. The fact that there are so many lines competing for business renders the freight service particularly efficient.

PLANT OF M. BEATTY & SONS, LIMITED, WELLAND.



BILLINGS & SPENCER PLANT OF CANADA FOUNDRIES & FORGINGS

The Welland Canal

The presence of this waterway gives Welland manufacturers the advantage of lake and rail rates. The present canal, though large enough when it was constructed, to admit of the passage of the biggest ships trading on the lakes, has long since become too small to accommodate the long upper lake freighters. To provide for their movement from Lake Erie to Lake Ontario, the new ship canal, now under construction, was designed. This new canal will have locks 800 feet long, 80 feet wide, and 30 feet water depth. There will be seven of these locks, all of the same dimensions.

A Few of Welland's Industries

One of Welland's earliest industries is the plant of M. Beatty & Sons, which was established in 1850, and has since carried on business continuously. The principal output of the company is made up of dredges of the dipper, hydraulic and clamshell types, hoisting engines of all sorts and sizes, both steam and electrically driven, mine hoists, travelling derricks, etc. The firm has built many large dredges, and these dredges can be seen on work throughout the Dominion. At the moment seven large "Beatty" dipped dredges, one hydraulic dredge, several drill boats, and numerous steel scows are in operation on the various sections of the ship canal construction. During the war M. Beatty & Sons concentrated on shrapnel shells, being one of the first firms to undertake this work in Canada. They also made high explosives. After the need of munitions had passed the crucial point, the manufacture of auxiliary ship machinery was taken up, and this company filled large orders for windlasses, cargo winches, ash hoists and similar equipment for the Imperial Munitions Board, the Emergency Fleet Corporation, and other interests.

The Canadian Billings & Spencer Plant of the Canadian Foundries & Forgings, Ltd., was engaged extensively on munitions during the war. This company is now just as busy turning out forged tools, the well-known "Endurance" brand being made at the Welland factory. All the operations in the manufacture of their product are accomplished in this factory, from the making of the original castings to the finished article.

The Electric Steel & Metals Co., Ltd., was formed in 1913 for the manufacture of steel castings by the electric method. This company employed 278 hands on munitions during the war, and is now producing high-grade steel castings of every description for bridge, dock and harbor construction. They have gone in extensively for welfare work on behalf of their employees, and provide many facilities for their comfort.

One of the newest industries is the Empire Cotton Mills, Ltd. They manufacture seamless bags, ducks, bag cloths, gray cotton fabrics and twine.

The metals - Chemical, Ltd., are engaged in the making of chemicals, and the Union Carbide Co. of Canada, have a large plant making acetylene and calcium carbide. The H. S. Peters Co., Ltd., are manufacturers of overalls and canned goods are put up by John Goodwillie & Sons. Chipman-Holton Knitting Co of Hamilton have a branch located in Welland, which produces hosiery. One of the plants of the Page-Hersey Iron & Lead Co., Ltd., is located here, which makes wrought, black and galvanized pipe.

At the Electro-Metals, Ltd., ferro-silicon and electrodes and manufactured, while at the Volta Mfg. Co., the product is electric regulators, winches and magnetic brakes.

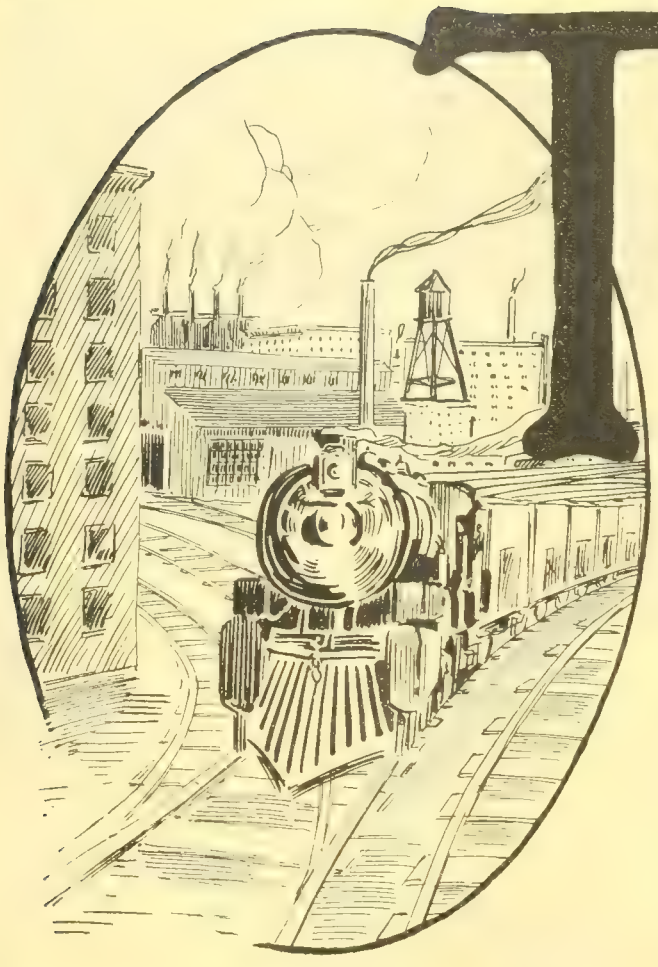
A complete list of the things made in Welland factories is quite large, and includes such imported articles as automobiles, agricultural machinery, brick, binder twine, boilers, coal stoves, cotton goods, canned fruit, cement blocks, contractors' machinery, dredges, derricks, electric trucks, engines, furnaces, gas ranges, hosiery, hoists, knitted goods, launches, overalls, rope, saws, sash and doors, scows, twine, underwear, etc.

The coming of factories has meant much more than a growth of urban population, with all its attendant advantages in the way of increased business for merchants and more work for builders and laborers. Its effect is noticed throughout the entire County of Welland. The roads have been improved and motorists find little to be desired. The city market is now large and active.

W. M. GERMAN, K.C.,
Industrial Commissioner.

Much of the credit for Welland's industrial growth and prosperity can be traced to its publicity campaigns and it can be held up as an example to other communities to show what energy and up-to-date advertising can accomplish.

At this writing everything points to further expansion in the near future, as Welland is to get the first 100,000 h.p. from the Chippewa Development, and plans are now being made to inaugurate a big industrial campaign.



The City

Railway and Wa
UNEQU

LAKE SHIPPING: Welland is situated on the Welland Canal, the great marine highway, between tide water and the Canadian North-West, with daily freight service both ways.

RAILROAD RATES: Rates from Welland to the North-West and Pacific Coast, all rail, are the same as from all other manufacturing points in Eastern Canada lying between the Detroit River and Montreal. These rates are fixed by the Board of Railway Commissioners for Canada.

On account of the close proximity to the border, Welland is in the Buffalo switching group, and takes the Buffalo rates from the east and south, and enjoys quick delivery on all raw material imported from the United States.

The fact that all of these roads centre here creates competition, and is the biggest lever the manufacturers have for securing efficient service from the railroads. The seven railroads are as follows: Grand Trunk, Michigan Central, Toronto, Hamilton and Buffalo, Canadian Northern, Pere Marquette, Canadian Pacific, Wabash.

W. M. GERMAN, K.C.

Industrial Commissioner

WELLAND - - CANADA

# of Welland

ter Transportation ALLED

Electric Power at lowest cost

Every factory in Welland is driven by electric power supplied by the Ontario Power Company, of Niagara Falls, which is about twelve miles east of Welland, or from the Dominion Power Company of DeCew Falls, which is about twelve miles north of Welland. The fact that we have competitive companies operating in this district gives us competitive prices on power.

Excellent factory sites at low prices.

Labor conditions are eminently satisfactory.

Liberal advantages and concessions granted by City Council.

Prompt and Full Replies will be made to all inquiries.

May we send Book of Information telling all about Welland?

Personal Interview Solicited

W. M. GERMAN, K.C.

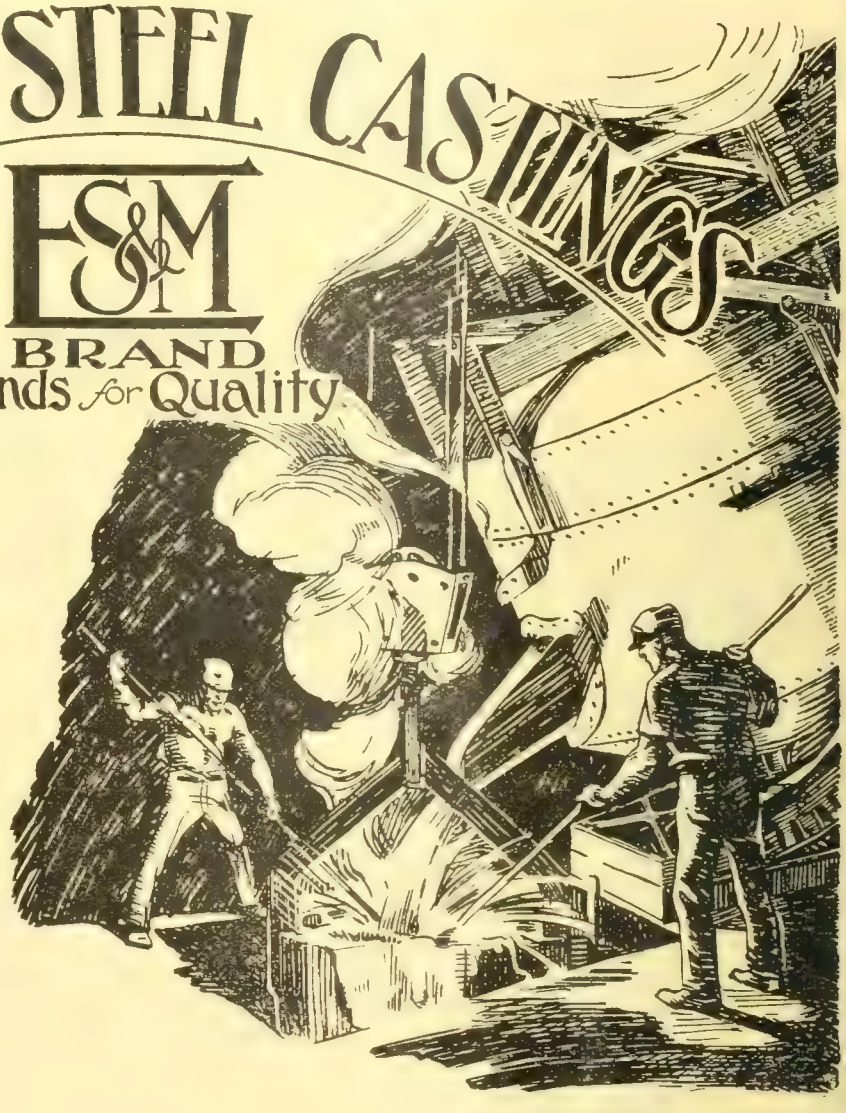
Industrial Commissioner

WELLAND - - CANADA

WELLAND SECTION

ELECTRIC STEEL CASTINGS

E S & M BRAND Stands for Quality



HIGH Grade **Steel Castings** of every description. Put our quality and service to the test and you'll be convinced that we offer the best.

Machinery Steel Castings

Bridge, Dock and Harbor Construction

Manganese Steel

Wearing parts for Gyratory Crushers, Dredger Pins and Bushes, etc., etc.

All Alloy Steel Castings.

Write for prices and particulars.

The Electric Steel & Metals Company, Limited

WELLAND, ONTARIO

If interested tear out this page and place with letters to be answered.

Canadian Trade and United States Steel Strike

HOW will the steel strike hit Canadian firms? It may be a little early yet to secure an intelligent answer to such a question. Some firms can go along indefinitely. Others can not. In some cases the effect will be felt very shortly.

Goold, Shapley & Muir, Brantford, make gas engines, tractors, windmills, tanks and towers, etc. They state:

"In our opinion, if the strike amongst the steel workers in the United States is at all prolonged, it will have a most serious effect upon industries using this class of material in Canada, as it will undoubtedly force many industries to shut down until supplies can be secured.

Unfortunately our Canadian steel industries are not yet sufficiently developed to secure all the product necessary in our own country, and in any case they would be so severely taxed that it would not be possible to supply the demand.

We sincerely hope that this matter may be adjusted at a very early date, as we look forward to serious consequences to the workers of Canada if Canadian manufacturers are compelled to close their works through a lack of supply of necessary material."

C. H. Waterous, of the Waterous Engine Works Co., Brantford: No doubt if the steel strike conditions for any length of time, and the production of steel is thereby decreased (which probably will be the case), it will have the effect of reducing the quantity of this material, and this will have a bad effect on Canadian business. Quite a number of sources of supply that were available before the war started are not now in a position to furnish material, which adds to the possibility of shortage."

Alex. R. Goldie, of the Goldie & McCulloch Co., Limited, Galt: "It is, of course, impossible as yet to foretell the result of this strike, as I do not know what stocks the steel companies in the States have been carrying, but, undoubtedly, if the strike continues for any length of time it will very seriously interfere with our business as a great part of the steel that we get from the United States cannot at present be obtained elsewhere. We have at present a good stock of steel material, so that we are not interfered with as yet, but certainly will be if the strike continues."

One of the largest makers of machine tools in the Dominion says: "We would advise that our purchases of hot rolled steel in the States are limited to small tonnage of hot rolled bars, 4 in. and larger, but, as we have ample stocks of these sizes on hand for some time, we do not think it will seriously interfere with our work. As we are large users of cold drawn steel, it may affect us, as we understand a great amount of steel drawn in this country is done from American bars."

E. Leonard & Sons, Limited, London, Ont., manufacturers of engines and boilers, state: "We have material on hand (or in transit) sufficient to cover the majority of orders now on our books. We also have a small stock of standard boiler plates, tubes, etc., with which we think we can take care of any orders that may come in for standard articles during the next month or six weeks. Orders for special boilers requiring special material would be delayed through the present strike."

Wm. Inglis, president of the John Inglis Company, Limited, Toronto, engineers and boiler makers: "I do not believe that this strike will amount to anything as far as Canadian business is concerned, as I understand the steel companies are taking care of all the business for this country under present conditions, as the mills that are affected do not make material that we import."

The Hamilton Bridge Works Company, Limited: "If the strike continues indefinitely and extends further, it is only a matter of time before firms in similar lines to ourselves will be unable to operate, for the reason that a large percentage of our materials, such as plates and structurals, come from the United States. At the present time only a small range of angles are manufactured in this country, and, therefore, our requirements cannot be obtained in Canada, and obtaining supplies from Britain and the Continent is out of the question at the present time. The Algoma Steel Corporation, Ltd., of Sault Ste. Marie, expect to be in a position in a few weeks to be rolling beams and channels up to 15 in. and angles up to 6 in. x 6 in., and as soon as this program is carried out some relief will be obtained."

Inquiry at the Dominion Shipbuilding Yards, Toronto, brought out the information that they have enough plate in stock to finish the two ships at present laid down. This will carry them through the winter, so they will not be affected, unless the strike extends over six months. Apart from the actual supply of material, the Dominion yards report they have plenty of labor, but the Port Arthur yards are having difficulty in getting men. Mr. Miller of the Port Arthur Shipbuilding Co. was in town a few days ago looking for riveters.

A despatch from St. Catharines says: The shortage of tin plate, caused by the steel strike in the United States, is causing a great deal of inconvenience among the canners and growers throughout the whole province. This district is especially hard hit, a few canneries being compelled to shut down owing to their stock of cans having become exhausted. The plants of the Dominion Canners at Welland and Niagara-on-the-Lake are closed, and the plant at Jordan Station will have to close.

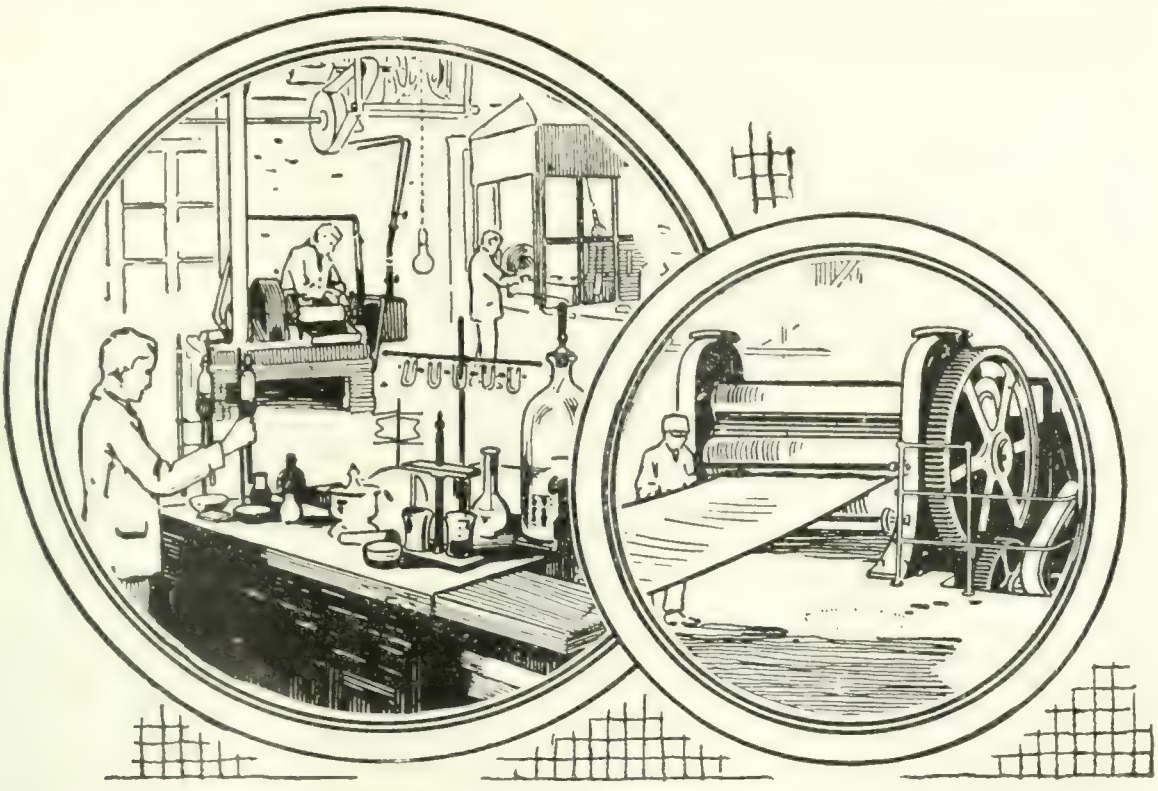
The Schenck plant, in this city, has a sufficient supply for to-day, while the Simcoe plant has by far the best supply, and will be able to keep in operation for a few days to come.

The Position in Montreal

MONTREAL, Que., Oct. 2.—The Steel Company of Canada continue to operate on a fair volume of business which may have shown a slight increase during the past week, which condition may have developed as a result of the steel situation in the States. Officials of the Steel Company state that it is largely heavy products, such as steel plates and shapes, that will be affected by the strike, and as the business in this direction is comparatively light at present, and a conservative policy is practised by builder and manufacturer, the Canadian situation will not feel the brunt of the strike in the States. Asked as to whether there was any danger of the strike spreading to this country, the official did not think so, and was under the impression that the strike among the American steel mills would be nearer a settlement by the end of the week. This appears to be the general opinion among steel men here.

The purchasing department of the Canadian Pacific Railway advises that the present requirements for steel supplies are such that the strike in the States has had little effect so far. In anticipation of a strike some time ago, they took care to obtain sufficient material to carry them over a reasonable period of idleness at the mills. In addition to this, their present steel requirements are not excessive, and unless the situation takes a more serious turn, they expect they will be able to carry on without being seriously hit by conditions in the steel districts.

Officials of the Montreal Locomotive Works report no serious effect as a result of the strike in the States. As a matter of fact, the plant here is operating much below normal, and their present requirements are not sufficient to feel the pressure of restricted supplies. They are optimistic regarding the strike and believe that a settlement will be reached within a short time. They state, however, that a long strike would materially upset the plans of Canadian manufacturers, as American conditions would naturally be reflected here, in which case the curtailed production of steel would be experienced all along the line. Considerable stock is now on hand, and with the small business booked, will be sufficient to carry them along for some time.



The Quality Standard That Produces "Plus Service" Belting

The only sure way to get satisfactory service is to buy products of known worth.

In Dominion Rubber System Belting, the worth is known because every ounce of material—each individual operation and each finished belt must test up to the highest quality standard ever made for belting.

From the time the materials come into our factory until the belt is running on your pulleys, there is no chance of your getting anything but "plus service" belting.

This is the result of over fifty years of belt making experience and research by the oldest, largest and most completely equipped rubber organization in Canada.

The rubber that goes into Dominion Friction Surfacing Belting is not a mere waterproofing substance—our chemists have given it a far greater value by making it into a friction compound that prevents practically all power wastage on the pulleys.

"Plus service" includes the free technical advice of our belting engineers who are ready to help you with your transmission and conveying problems without placing you under obligation to us.

A phone call, wire or letter to our nearest branch places all of our facilities at your disposal.

CANADIAN CONSOLIDATED RUBBER CO. LIMITED
DOMINION RUBBER SYSTEM
AND ASSOCIATED COMPANIES

Service Branches:

Halifax,	Toronto,	Fort William,	Edmonton,
St. John,	Hamilton,	Winnipeg,	Calgary,
Quebec,	London,	Brandon,	Lethbridge,
Montreal,	Kitchener,	Regina,	Vancouver,
Ottawa,	North Bay,	Saskatoon,	Victoria.

If interested tear out this page and place with letters to be answered.

MONTREAL NOTES

Sometime ago it was announced that Paul Mercier, chief engineer of the city of Montreal, was resigning from the position. It is now learned that he will not be entirely dissociated from the affairs of the city, as he has been retained in the employ of the ratepayers as a consulting engineer. His time, however, will only be partly occupied in this connection, as he will join the staff of the Ecole Polytechnique as an instructor and lecturer.

* * *

On the recommendation of the chief of the fire department the Administrative Commission of the city of Montreal have under consideration the revision of the regulations regarding the installation of dry sprinkler systems in big office buildings and inudstrial plants, so that hose connections from the outside could be utilized when conditions prevent the access to the interior. A revised by-law is now before the council for their approval and ratification.

* * *

The shipbuilding plant of the Canadian Vickers Limited was the scene of a serious accident last week, when one man was so badly injured that he died shortly after, and fourteen or more were so seriously hurt that they required medical attendance either at the plant or at the hospital. It is supposed that an acetylene tank had been placed too close to an open fire and that the tank had become overheated, resulting in the explosion. The effect of the explosion was to wreck the walls of the adjoining building and break almost all of the glass in the side and the roof in which the accident took place.

* * *

Should the railway strike in England continue for any length of time there is the probability that the shipping activities will be seriously interfered with, as the inability to remove the goods from the respective wharfs will cause a congestion that can have only one result, the practical embargo of imports and exports of anything but the most essential products. This condition has not yet been felt here, but it is not unlikely that some action will be taken within the week. Prior notification to this effect has already been issued by the British embassy at Washington, and a confirmation of this order is almost imminent.

* * *

During the recent stay of the C. P. O. S. liner Corsican in the port of Montreal, a test was made of a new apparatus designed to facilitate the lowering of lifeboats from a vessel at sea. The device is a simple attachment of skids placed over the ordinary lifeboat, and it was shown that, no matter what angle the ship may be listed at, the presence of these skids permits the lowering of these boats with perfect ease and safety. This appliance was designed by Mr. Hylands, of New York, and has already been adopted by the United States Navy and the U. S. Shipping Board, and the recent demonstration at Montreal was effected with a view of introducing the invention in Canada.

* * *

For many months the Dominion Bridge Company have been actively engaged in the making of machinery for the paper industry. While in some respects the initial work was more or less in the nature of experiments, the rapid growth and the future needs of this great Canadian industry has practically decided the officials of this company to manufacture this line of equipment as part of their post-war developments. The bulk of the machinery now used in the pulp and paper mills has been imported from other countries, but the enterprise of this firm will enable them to supply Canadian-made products for Canadian production. It is believed that contracts have already been made with some of the provincial mills.

* * *

Members of the Kiwanis Club recently paid a visit to the Angus shops of the C. P. R., and had the opportunity of viewing the activities that are going on at these works. They were royally entertained by the officials of the company, lunch being served in the dining room at the plant. It might be mentioned that some of their past activities have been the production of 77 large locomotives in a year, in addition to about 338 passenger and 6,530 freight cars. At present the shops are engaged in heavy repairs to 50 locomotives and are also turning out four new ones a month. They are also repairing about 100 freight cars and eight passenger coaches per day. Among the new productions are refrigerator and flat cars, as well as a new type of all-steel tourist coaches, of which thirty are being made.

* * *

Some comment has been made by manufacturers here on the report from England, that Canadian manufacturers are taking orders that they cannot fill, or cancelling the same after they have once been accepted. It is stated that in many cases Canadian manufacturers here are unable to take care of the business that is offered, but the real fault lies with the brokers and commission agents, who are too ready to accept export business before ascertaining whether the goods or articles can be supplied. It is generally contended that strikes and industrial disturbances have prevented anything like capacity production, a condition that is seldom attained in reorganization or reconstruction periods. Large quantities of manufactured goods, for variety requirements, are being demanded by foreign countries, but combination of circumstances prevent the handling of these goods.

* * *

On Saturday of last week the cargo steamer "Alsace" was successfully launched from the yard of the Canadian Vickers Limited. The vessel was first consecrated by the French clergy here, and the ribbon was then cut by Madame Begard, wife of Capt. L. Begard, the representative of Cie Francaise d'Armement d'Importation de Nitrate de Soude, of Paris, France, for which company the vessel was built. The S. S. Alsace is a single screw steamer of approximately 8,400 tons and will have a speed of about 11 knots. She is 400 feet long, 52 feet beam and with a depth of 31 feet. She is especially designed for the nitrate trade from Chili to France, and is fully up to the requirements of the French Board of Trade and Lloyds 100-AE classification. It is expected that the vessel will be completed and ready for loading in the course of three or four weeks.

ST. JOHN, N.B., NOTES

ST. JOHN.—Damage to the extent of some $25,000 was done this week in the destruction by fire of two warehouses owned by the Wallace Machinery Works, at Sussex, N.B. Some material in the warehouses was destroyed, including eight threshing machines, wood-cutters, and some valuable patterns. The loss was partly insured.

* * *

A new pork-packing plant is to be established at Moncton, N.B., by two St. John men, Walter Jones and Wm. Davis, under the firm name of Jones and Davis. They have purchased land and begun construction of the plant which will have a front of 50 feet, and in which modern machinery will be installed.

* * *

H. J. Ramshaw, of Hamilton, Ont., manager of the Garlock Packing Co., was in St. John this week and established a branch of the company here. They will carry a stock of engines and other apparatus for industrial plants. The branch will serve as a distributing centre for the maritime provinces.

* * *

Capt. William Burrill has returned home after a lengthy period of service overseas. He left here in June, 1915, as paymaster with the 26th Battalion, and went to France with it that year. With the exception of a brief visit home for a few days last spring he has since been overseas. He was formerly with the Canadian Fairbanks-Morse, Ltd., in St. John.

* * *

Plans for the supplying of power from the Nepisiquit River will come before the Provincial Government at its meeting in Fredericton, N.B., next week. The power is for the Bathurst Lumber Co., to supply their pulp mills, and will be an important factor if the Government approves of the scheme.

* * *

Work was begun this week on the construction of a new brick addition to the buildings of John Palmer, Ltd., at Fredericton, N.B. The work will give an additional floor space of 15,000 feet for the oil tanning footwear department. The construction work is in charge of John C. Smith and the contract represents approximately $25,000. It will be quite an addition to this manufacturing concern's plant.

PERSONALS

James R. McNeil, who recently resigned his position as manager of No. 11 colliery of the Dominion Coal Co., to assume charge of the Florence mine, of the Nova Scotia Steel and Coal Co., at New Glasgow, has entered upon his new duties. Mr. McNeil's engagement by the Scotia Co. follows closely upon the appointment of Mr. A. S. McNeil as superintendent of mines of the Nova Scotia Steel & Coal Co., and D. H. McLean as manager of their Princess mines, both of whom severed their connection with the Dominion Coal Co. to take up new responsibilities with the Co. on the north side of the harbor. The Florence, or No. 3 mine, is Scotia's largest producer with a daily output of between 800 and 900 tons.

TENDERS

Tenders will be received up till October 6, 1919, for the construction of a grain conveyor in St. John Harbor, N.B. Plans and specifications can be obtained at the Department of Public Works, Ottawa, or at the offices of the District Engineers, Shaughnessy Building, Montreal, and Equity Building, Toronto, also the engineer in charge, St. John, N.B.

TRADE GOSSIP

Equipment Wanted.—C. P. Wilson Co., 509 Lumsden Building, Toronto, are in the market for a travelling crane; also a locomotive crane, both of ten-ton capacity.

Wants Machinery.—G. W. Allan, of Allan & McKelvie, Engineering Co., Ltd., Vancouver, has been in the east on his way to the Philadelphia convention. He is in the market for an open-sided planer and a miller. His firm is going in for saw-mill machinery.

Leaside Shops Busy.—There are a good number of locomotives and coaches being overhauled at the Leaside shops of the C. N. R. More men are being take on from day to day, and it will soon be necessary to add another coach to the work train which runs daily from North Toronto.

Busy Ingersoll.—Mayor Buchanan, Ingersoll, Ont., reports that all industries there, including two new ones added during the year, are in a thriving condition. The town has available for immediate use a building of 25,000 feet floor space, suitable for manufacturing purposes. Its location is most favorable, standing as it does between the two lines of railway serving the town.

Error in Classification.—Owing to an error in classification, the Volta Manufacturing Co., of Welland, has not been fully listed in our Buyers' Directory. The name now appears under the following headings: Electric furnaces, drum controls, electric furnace regulators, winches, roof coolers, and electrode holders, electric hoists, stationary and monorail, cranes, overhead (hand and electric), current transformers.

Increase Capital.—The Lufkin Rule Co. are increasing their capital from $100,000 to $150,000 by adding 5,000 shares of $10 each.

Plant Extending.—The latest branch of industry to announce an extension is the Brantford Oven & Rack Co., which will double its plant here owing to increased demands for its output. Almost every factory in the city has either extended this year or is working on plans for such extension, and the boom is not inflated, as never were building costs so great. It is expected that within a few days another important announcement will be made along industrial lines.

Machine Tools, Etc.—The import department of a firm with head office in Calcutta and branches in New York and London, desires to secure representation in India for Canadian manufacturers. They are interested chiefly in machine tools, mill and factory equipment, marine and stationary engines, electrical apparatus, motor cars and equipment. Their organization is exceptionally strong. References, particulars by addressing Trade and Commerce Dept., Ottawa, and referring to No. 2767.

Canadian Steel Corporation.—Although actual construction has been held back rather than rushed, the work on the plant of the Canadian Steel Corporation at Ojibway has been going on slowly. One foundation for a 600-ton furnace is now in and work started on a second. Speaking of costs, one of the Steel Corporation men told CANADIAN MACHINERY that the foundation of a 600-ton blast furnace now cost as much as a complete 250-ton stack in pre-war days. Although no definite plans are yet announced, it is known that the Canadian Steel Corporation have big plans under way for the Ojibway plant.

Canadian Goods for New Zealand.—The Canadian Trade Commissioner for New Zealand addressing a meeting of the Chamber of Commerce at London, Ont., advised them to develop the export trade. The people of New Zealand were anxious to buy Canadian goods, and were even to pay a little higher price for articles that were imported from Germany previous to the war.

Bonus for Workmen.—The employees

of the Engineering and Machinery Corporation of Canada, St. Catharines, are paying a bonus of 5 per cent. to all their workmen, on the year's wages ending July 31 last.

The Electric Furnace.—At a recent conference of metallurgical specialists in Chicago, an Electric Furnace Association was formed with Aitchison Smith, Niagara Falls, N.Y., as president. Membership is open to Canadians interested in the development and manufacture of electric furnaces, materials, supplies or equipment. It is becoming increasingly evident that the electric furnace is about to become a big factor in the metal industry, not only in connection with the production of steel and steel castings, but also in malleable and grey iron castings. An authority states it to be an established fact that the strength of a grey iron casting poured from an electric furnace can be improved from 50 to 90 per cent.

For Trade Abroad.—If any Canadians are interested in the following, write: Intelligence Branch, Trade and Commerce Department, Ottawa, and refer to 15 R. S.—Steel and iron products, machinery, etc.—A returned soldier who spent four years with the Canadian army in France, having technical and practical knowledge of the production and distribution of steel and iron products, machinery, etc, possessing a board commercial and business training, and extensively traveled, would like to get in touch with manufacturers or others who are desirous of establishing or increasing European trade. Before the war he held the position of sales manager for an important firm dealing in iron and steel products.

Plant Changes Hands.—The plant of the Canadian Aeroplane Ltd., on Dufferin street, north of Lappin avenue, has been sold by the Imperial Munitions Board to the Columbia Graphophone Company for $600,000. With the single exception of the Massey-Harris works this is the largest plant under one roof in Toronto. It was used for the building of aeroplanes during the war. The building is two storeys high, of concrete and brick construction and contains over 250,000 square feet of floor space, while the site contains a little over 10 acres. The frontage on Dufferin begins a few yards north of the corner of Lappin and Dufferin on the west side and runs north 333 feet, while the depth of the site is exactly a quarter of a mile.

New Steel Cars.—The first of approximately 100 new steel passenger cars was delivered to the Canadian National Railways, and it is confidently expected that the entire order, comprising six classes of cars, will be completed by the end of January, 1920. It has been thought that the Canadian builders might have been tampered by the convulsion in labor in the steel trade in the United States, but Mr. George E. Smart, General Master Car Builder of the C.N.R., who has been to the affected centres investigating, reports to-day that the steel for the "National" cars was shipped just prior to the outbreak of trouble at the great steel plants. The new steel passenger equipment under order for the C.N.R., includes 20 tourist cars, 18 standard sleeping cars, 9 dining cars, 20 mail cars, 20 first-class coaches, and 13 compartment observation cars. Travel has been heavy all through the summer season, and the C.N.R. is inaugurating shortly new trains to round out a daily transcontinental service in both directions across Canada. The new steel equipment that is now under construction for the National lines is most modern in every respect.

Want a Six-Hour Day.—The United Mine Workers of America at a recent convention formulated demands for a six-hour day, 60 per cent. increase in all mine wages, and a five-day week, with time and a half for overtime and double time for holidays and Sundays. The convention adjourned to await the result of the joint wage scale conference, with the operators of the central competitive district. If a satisfactory issue is made of this conference they

will reconvene at Indianapolis to accept or reject it. If no agreement is ratified before November 1 a general strike of bituminous miners will automatically ensue on that date. This may easily extend to the Canadian fields if the International officers so decree.

CLASSIFIED ADVERTISING SECTION

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order $1.00. Display rates on application.

HELP WANTED

WANTED FIRST-CLASS DIE SINKERS ON Automobile Drop Forge work. Apply stating experience and wages expected, to Canada Pole and Shaft Co., Ltd., Merritton, Ontario. (c19m)

WANTED TECHNICALLY TRAINED MAN, with a view to taking up designing of electrical apparatus, principally A.C. Motors. An opportunity for the right party. Box No. 630, Canadian Machinery. (c15m)

MACHINE WORK WANTED

MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (efm)

BRANTFORD PATTERN WORKS ARE PREpared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell 'Phone 631; Machine 'Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (ctfm)

Wanted

A firm of Canadian engineers to manufacture and sell on royalty basis a hand-operated stoker. This is an established appliance, and is the ideal installation for the small plant, where investment cost is an important item. Combustion principles are same as on highest priced automatic stokers. The ideal stoker for the Canadian market, where the one boiler plant is in the majority. Write to Box 632, Canadian Machinery, 143 University Ave., Toronto, Canada.

PATENTS FOR SALE

Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

Allentown Experimental Works
Allentown, Pa., U.S.A.

Mining Machinery for Sale

Alley & McLellan Air Compressor 600 ft. at 100 lbs. pressure, 125 H.P. Motor, heavy duty 600 R.P.M. 3 phase 60 cycle 550 volts.
Ingersoll-Rand 800 ft. Air Compressor.
1 Tube Mill Fraser & Chalmers 5 x 22.
1 Power & Mining 5 x 22.
Also large assortment of Pumps, Tanks, Classifiers, Boilers and Mining Equipment for sale.

Zenith Coal & Steel Products Limited
402 McGill Building Montreal
1410 Royal Bank Bldg., Toronto, Ont.

WHEN WRITING ADVERTISERS PLEASE MENTION THIS PAPER

BRASS ROD For Sale

At a Very Attractive Price

Free Turning

Round Brass Rod

Mill lengths of the following sizes:—		Diameter
30,000 lbs...	.250"	¼"
24,500 lbs...	.533"	Abt. .17/32"
62,500 lbs...	.625"	⅝"
73,250 lbs...	.750"	¾"
27,500 lbs...	.9375"	15/16"
46,750 lbs...	1.000"	1"
45,000 lbs...	1,250"	1¼"
26,000 lbs...	1.375"	1⅜"
39,000 lbs...	2.000"	2"

Above is all new material stored at the manufacturers' plant in Connecticut, ready for prompt shipment and has passed Government inspection. Address Box 625 Canadian Machinery.

Re-Built Machine Tools For Sale at Bargain Prices

One Oliver Tool Room Lathe, 16 in. by 7 ft. bed, complete with taper attachment, relieving attachment, chuck etc., hollow spindle, double back gear, large and small face plate and steady rest, in perfect condition.

One LeBlond Tool Room Lathe, plain change gears, single back gear, hollow spindle, 16 in. by 6 ft. bed.

Ten C.M.C. Lathes, 20 in. by 8 ft. bed, double back gear, hollow spindle, semi-quick change gear.

Two Davenport, 22 in. by 10 ft., quick change gear Lathes, like new, very cheap.

Also full line of other Machine Tools and Woodworking Machinery. For full particulars apply to The Canadian Equipment & Tool Works, 179 St. James St., Montreal, Que. (c15m)

FACTORY AVAILABLE

Ingersoll, Ont., offers a factory of twenty thousand square feet of floor space on terms which cannot be equalled in Canada. **Are you interested?**

Write S. A. GIBSON, Industrial Commissioner, or MAYOR J. V. BUCHANAN, Ingersoll. c14m

One of the things we all do well is to forget.

Names that were household words yesterday are gone to-day.

Because people knew your Name and your Line a year ago it is no sign they do to-day. They forget easily.

Keep yourself in the public mind by advertising. It is just as important to make old friends remember as it is to win new friends. Advertising does both.

If interested tear out this page and place with letters to be answered.

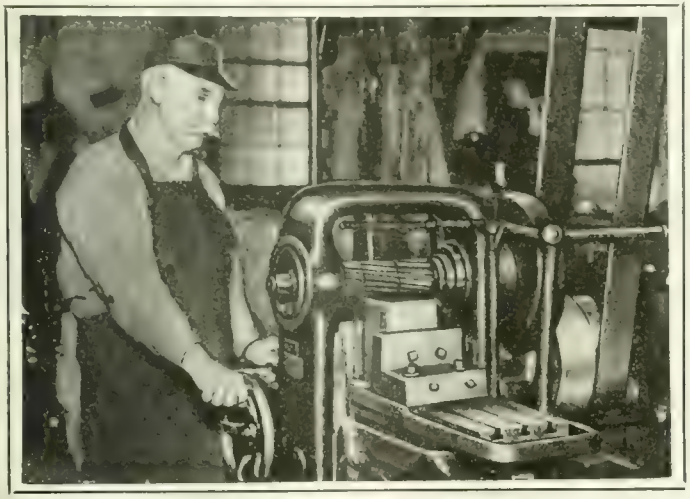
If interested tear out this page and place with letters to be answered.

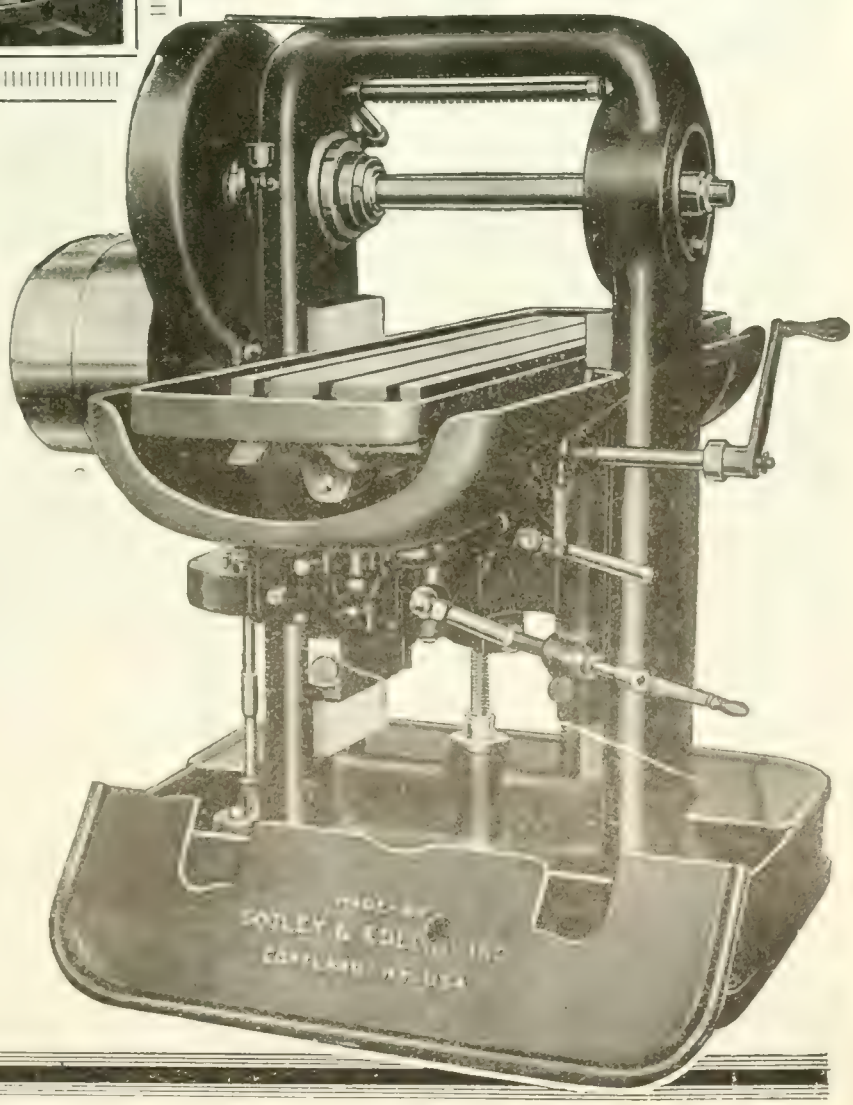
If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

BRIGGS MILLER

Keeps Five Die Sinkers Going





HERE you see the Briggs Miller Squaring Die Blocks, and it is working so fast it keeps five die sinkers going.

Some are new, squared from the rough; some are old, annealed, cut down and made over; some are oblong, some square, in sizes up to 9 inches. This Briggs Miller has been squaring blocks for four years; has never given any trouble. When cutters get dull the operator has another gang ready to go on with the work. Unusual rigidity accounts for Briggs' higher efficiency.

Don't you think you could use this tool to advantage in your shop? Write for the details.

Gooley & Edlund, Inc.

Cortland, N.Y., U.S.A.

Garlock Walker Machinery Co., Ltd.
Toronto, Ont.

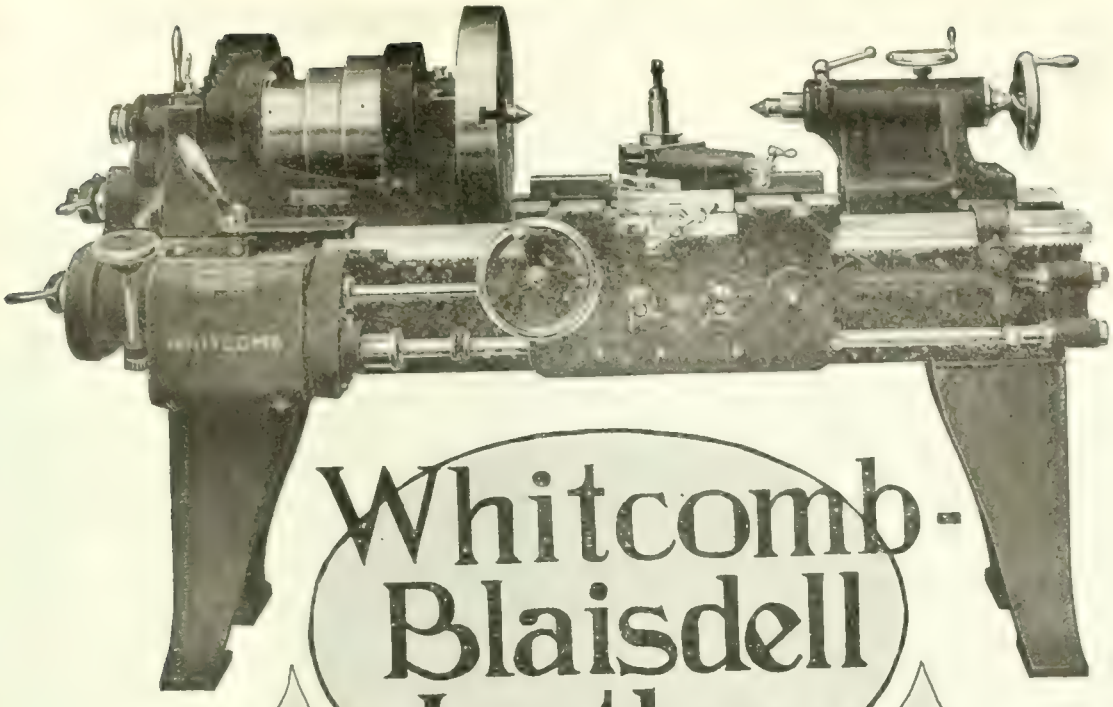
Williams & Wilson, Ltd., Montreal

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.



Whitcomb-Blaisdell Lathes

POWERFUL, WELL-BALANCED MACHINES THAT ARE LIGHT-RUNNING AND ADAPTED TO ALL CLASSES OF **RAPID MANUFACTURING.**

Every feature of the W-B Lathe of to-day has been considered from the viewpoint of greatest utility. Materials used embody toughness and durability. Our tests must prove great wearing quality and strength before any material is selected.

The product of an organization that has for sixty years been distinguished for the superior design, workmanship and material of its product

Write for our latest catalog describing all of the good features of Whitcomb-Blaisdell Lathes

Lathes

WHITCOMB-BLAISDELL MACHINE TOOL CO.

WORCESTER, MASS.

Just Try These-They're CLEVELAND

THE CLEVELAND TWIST DRILL CO., Cleveland, New York, Chicago

Agents for Europe, CLEVELAND TWIST DRILL CO. (GREAT BRITAIN), Ltd., 36-37 Upper Thames St., London E. C. 4.

Listen, Old Man, Why don't you use

CLEVELAND

THE CLEVELAND TWIST DRILL CO., Cleveland, New York, Chicago

Agents for Europe, CLEVELAND TWIST DRILL CO. (GREAT BRITAIN), Ltd., 36-37 Upper Thames St., London E.C.4.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

HINTS TO BUYERS

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

If interested tear out this page and place with letters to be answered.

If interested tear out this page and place with letters to be answered.

Canadian Machinery BUYERS DIRECTORY

If what you want is not here, write us, and we will tell you where to get it. Let us suggest that you consult also the advertisers' index facing the inside back cover, after having secured advertisers' names from this directory. The information you desire may be found in the advertising pages. This department is maintained for the benefit and convenience of our readers. The insertion of our advertisers' names under proper headings is gladly undertaken, but does not become part of an advertising contract.

ABRASIVE MATERIALS
Aikenhead Hardware Co., Toronto, Ont.
Brantford Emery Wheel Co., Brantford.
Canadian Fairbanks-Morse Co., Montreal
Geo. F. Foss Mchy. & Sply. Co., Montreal
Ford-Smith Mach. Co., Hamilton, Ont.
Norton Co., Worcester, Mass.
Plewes, Ltd., Winnipeg, Man.
Pittsburgh Crushed Steel Co., Pittsburgh
Rice Lewis & Son, Toronto, Ont.
William & Wilson, Ltd., Montreal.

ACETYLENE
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Union Carbide Co., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

ACETYLENE GENERATORS
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

ACORN DIE AND HOLDERS
Greenfield Tap & Die Corp., Greenfield
Wells Bros. of Canada, Galt, Ont.

ACCUMULATORS, HYDRAULIC
Canadian Fairbanks-Morse Co., Montreal
Garlock-Walker Mach'y. Co., Toronto.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Ltd., Montreal.

AIR COMPRESSORS
See Compressors.

AIR CYLINDERS
Smalley-General Co., Bay City, Mich.

AIR RECEIVERS
Can. Ingersoll-Rand Co., Sherbrooke, P.Q.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal.
Williams & Wilson, Ltd., Montreal.
Welding & Supplies Co., Montreal, Que.

AIR WASHERS
Can. Blower & Forge Co., Kitchener

ALUMINUM
Canada Metal Co., Toronto.
Tallman Brass & Metal Co., Hamilton.
Williams & Wilson, Ltd., Montreal.

ALLOY, STEEL
Armstrong, Whitworth of Can., Montreal
Blanche Co., L. C., New York City
Baker & Co., Inc., H., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
General Steel Co., Milwaukee, Wis.
Hawkridge Bros. Co., Boston, Mass.
Kayser Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Pilot Steel & Tool Co., Montreal, Que.
Swedish Steel & Importing, Montreal
Vanadium Alloys Steel Co., Pittsburgh.
Vulcan Crucible Steel Co., Aliquippa, Pa.

ANCHORS
Fellows Bros., Ltd., Chadley Heath, Eng.

ARBORS
Brown & Sharpe Mfg. Co., Providence, R.I.
Canadian Fairbanks-Morse Co., Montreal
Cleveland Twist Drill Co., Cleveland
Ford-Smith Machine Co., Hamilton, Ont.
Wilson & Co., J. C., Belleville, Ont.
Garlock-Walker Machinery Co., Toronto
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Williams & Wilson, Limited, Montreal

ARCHITECTURAL IRON
Page Steel & Wire Co., Adrian, Mich.

ARRESTERS, DUST
Northern Crane Wks., Walkerville, Ont.
Pangborn Corporation, Hagerstown, Md.

AUTOGENOUS WELDING AND CUTTING PLANTS
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal
Welding & Supplies Co., Montreal, Que.

AUTOMATIC MACHINERY
Baird Machine Co., Bridgeport, Conn.
Garlock-Walker Machy. Co., Toronto.
Gardiner & Son, Robert, Montreal
National Acme Co., Cleveland, Windsor
Pratt & Whitney Co., Dundas, Ont.
Rockford Machine & Tool Co., Toronto.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

AUTOMATIC METAL CUTTING-OFF MACHINES
Greenfield Tap & Die Corp., Greenfield
Wells Bros., of Can., Galt, Ont.
Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal
Canada Metal Co., Toronto
G. F. Foss Mchy. & Sply. Co., Montreal.

AUTO SHEET METAL MACHINERY
Quickwork Co., St. Marys, Ohio.

AUXILIARY HEADS
Hoefer Mfg. Co., Freeport, Ill.

BABBITT METAL
Canada Metal Co., Ltd., Toronto, Ont.
Hoyt Metal Co., Ltd., Toronto
Magnolia Metal Co., Montreal.
Rice Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Limited, Montreal.

BAND SAWS
Oliver Machy. Co., Grand Rapids, Mich.

BALL BEARINGS
Canadian Fairbanks-Morse Co., Montreal
Can. S K F Co., Toronto, Ont
Chapman Double Ball Bearing Company, Toronto
The Gray Ball Bearing Co., Ltd., Toronto
Morrow Screw & Nut Co., John, Ingersoll
Rochester Ball Bearing Co., Rochester
Williams & Wilson Ltd., Montreal, Que

BALLS, STEEL
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blanche Co., L. C., New York City
Chapman Double Ball Bearing Co., Toronto
Baker & Co., Inc., Montreal, Que.
Gray Ball Bearing Co., Ltd., Toronto.
Rochester Ball Bearing Co., Rochester.
Marshall, Son & Bunney, Toronto.
Williams & Wilson, Limited, Montreal

BALLS, BURNISHING
Gray Ball Bearing Co., Ltd., Toronto.

BAROMETERS
Taylor Instrument Co., Rochester, N.Y.

BARRELS, SAND-BLAST
Pangborn Corp., Hagerstown, Md.

BARRELS, STEEL SHOP
Baird Machine Co., Bridgeport, Conn.
Cleveland Wire Spring Co., Cleveland.

BARRELS, TUMBLING
Baird Machine Co., Bridgeport, Conn.
Katie Foundry, Galt, Ont.
Northern Crane Works, Walkerville, Ont.
Wilson & Co., J. C., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que

BASE FACING MACHINES
Victoria Foundry Co., Ottawa, Ont.

BARS, BORING
Gisholt Machine Co., Madison, Wis.
Niles-Bement-Pond Co., New York.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que

BARS, MERCHANT
Algoma Steel Corp., Sault Ste. Marie.

BARS, CONCRETE REINFORCING
Algoma Steel Corp., Sault Ste. Marie

BEADING MACHINES
Quickwork Co., St. Marys, Ohio.

BELT CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
William & Wilson, Limited, Montreal

BEARINGS, BRONZE
Wilson & Co., J. C., Belleville, Ont.

BEARINGS, DIE CAST
Franklin Mfg. Co., Syracuse, N.Y.

BELT-LACING MACHINES, HOOKS AND PINS
Clipper Belt Lacer Co., Grand Rapids

BELT LACING LEATHER
Aikenhead Hardware Co., Toronto, Ont.
G. F. Foss Mchy. & Sply. Co., Montreal
Graton & Knight Mfg., Worcester, Mass
Rice Lewis & Son, Toronto, Ont

BELTING, BALATA
Federal Engineering Co., Toronto, Ont.

BELT HOOKS, WIRE
Clipper Belt Lacer Co., Grand Rapids

BELTING, RUBBER
Can. Consolidated Rubber Co., Montreal.

BELTING, CHAIN
Can. Fairbanks-Morse Co., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Whitney Mfg. Co., Hartford, Conn.
Williams & Wilson, Ltd., Montreal, Que

BELTING, CONVEYOR
Can. Consolidated Rubber Co., Montreal.
Baxter & Co., Ltd., J. R., Montreal
Canadian Fairbanks-Morse Co., Montreal
Federal Engineering Co., Ltd., Toronto
Graton & Knight Mfg., Worcester, Mass.
Jones & Glassco, Montreal, Que
McLaren Belting Co., J. C., Montreal.
Morse Chain Co., Ithaca, N.Y.
Plewes, Ltd., Winnipeg, Man
Rice Lewis & Son, Toronto, Ont
Standard Machy. & Supplies, Montreal.
Williams & Wilson, Ltd., Montreal, Que

BELTING, FRICTION AND SURFACE
Can. Con. Rubber Co., Ltd., Montreal.

BELTING, LEATHER
Can. Graton & Knight Mfg. Co., Montreal
John Tullis & Son, Glasgow, Scotland.

BELTING, WOVEN
Federal Engineering Co., Ltd., Toronto

BENDING ROLLS, PLUTE & AUGH
Wickes Bros., Saginaw, Mich.

BENDING MACHINERY
Bertrams, Ltd., Edinburgh, Scotland
Bertram & Sons Co., John, Dundas
Brown-Boggs Co., Ltd., Hamilton, Ont.
Can. Blower & Forge Co., Kitchener
Garlock Walker Mach. Co., Toronto.
Williams & Wilson, Ltd., Montreal

BLASTING MACHINES, SAND
Garlock-Walker Machinery Co., Toronto.
Jardine, A. B., & Co., Hespeler, Ont.
National Mach. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York
Toledo Machine & Tool Co., Toledo
Williams & Wilson, Limited, Montreal.

BILLET MARKERS
Matthews & Co., Jas. H., Pittsburgh, Pa

BILLETS
Atkins & Co., Ltd., Wm. Sheffield, Eng.
Swedish Steel & Importing Co., Ltd. Montreal.
Algoma Steel Corp., Sault Ste. Marie
Kayser Ellison & Co., Ltd., Montreal
Marshall, Son & Bunney, Toronto
Norton, Ralph B., Agent, Montreal

BILLETS, FORGING
General Steel Co., Milwaukee, Wis.
Kayser Ellison & Co., Ltd., Montreal
Norton, Ralph B., Agent, Montreal.

BINS, STEEL
Darling Bros. & Iron Works, London, Ont.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto, Ont.
William Hamilton Co., Peterboro, Ont.

BLACKSMITH WORK
The Thos. Peak Co., Ltd., Pembroke

BLASTING MACHINES, SHOT AND STEEL GRIT
Pittsburgh Crushed Steel Co., Pittsburgh

BLOOMS AND SLABS
Algoma Steel Corp., Sault Ste. Marie.

BLOWERS
Can. Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Machinery Co., Toronto.
MacGregor & Co., Montreal, Que.
Williams & Wilson, Limited, Montreal.

BLOW PIPES AND REGULATORS
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

BLUE PRINTING MACHINERY
Commercial Camera Co., Providence, R.I.
Wickes Bros., Saginaw, Mich.

BOARDS, GLASS CUTTING
Lufkin Rule Co., of Can., Windsor, Ont.

BOARTZ
Joyce, Kochel & Co., Inc., New York.

BOLT CUTTERS
Greenfield Tap & Die Corp., Greenfield, Mass

BOLT CUTTERS
Fellows Gear Shaper Co., Springfield, Vt.
Greenfield Tap & Die Corp., Greenfield, Mass
Wells Bros., of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

BOOKS, TECHNICAL
MacLean Publishing Co., Toronto.

BOILERS
Dominion Bridge Co., Montreal, Que.
MacGovern & Co., Montreal, Que.

BOILER BREECHINGS
William Hamilton Co., Peterboro, Ont.

BOLT CUTTERS AND NUT TAPERS
Aikenhead Hardware Co., Toronto, Ont.
Canadian Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto
Landis Machine Co., Waynesboro, Pa.
A.B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.
Wells Bros. Co. of Canada, Galt, Ont.
Williams & Wilson, Limited, Montreal.

BOLTS
Aikenhead Hardware Co., Toronto, Ont.
London Bolt & Hinge Wks., London, Ont.
Morrow Screw & Nut Co., John, Ingersoll.
Rice, Lewis & Son, Toronto, Ont.
Steel Co., of Canada, Ltd., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

BOLTS, COUPLING
Galt Machine Screw Co., Ltd., Galt, Ont.

BOLTS, STAY
Morrow Screw & Nut Co., John, Ingersoll.

BOLTS, SPRING SHAKLE
Can. Winkley Co., Ltd., Windsor, Ont.
Morrow Screw & Nut Co., John, Ingersoll.

BOLTS, PATCH
Morrow Screw & Nut Co., John, Ingersoll.

BOLT AND NUT MACHINERY
Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto
Gardiner & Son, Robt., Montreal
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
National Machinery Co., Tiffin, Ohio
Williams & Wilson, Ltd., Montreal, Que.
Williams Machinery Co., A. R., Toronto

BOLT THREADING MACHINERY
Jardine & Co., Ltd., R., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson, Limited, Montreal

BORING MACHINES, PNEUMATIC CYLINDER
Cleveland Pneumatic Tool Co., Toronto.
Canadian Fairbanks-Morse Co., Montreal
Can. Ingersoll-Rand Co., Sherbrooke, Que
Garlock-Walker Mach. Co., Toronto.

BORING MACHINES, UPRIGHT AND HORIZONTAL
Bertram & Sons Co., John, Dundas, Ont.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garlock Walker Machinery Co., Toronto
Oliver Machy. Co., Grand Rapids, Mich.
Gisholt Machine Co., Madison, Wis.
Hoefer Mfg., Co., Freeport, Ill.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Rockford Machine & Tool Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que

BORING AND TURNING MILLS
Bertram & Sons Co., John, Dundas.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Gisholt Machine Co., Madison, Wis.
Foss Mch. & S'ply Co., Geo. F., Montreal
Oliver Mach. Co., Grand Rapids, Mich.
Niles-Bement-Pond Co., New York
Williams & Wilson, Ltd., Montreal Que.

BUYERS' DIRECTORY

BOXES, CAST IRON
Brown & Sharpe Mfg. Co., Providence, R.I.

BOXES, STEEL SHOP AND TOTE
Cleveland Wire Spring Co., Cleveland.

BRAKEBAND LINING CUTTERS
Peck, Stow & Wilcox Co., Southington, Conn.

BRAKES
Brown, Boggs & Co., Hamilton, Can.
Electric Steel & Metals, Ltd., Welland.

BRASS AND COPPER BARS, RODS BRAKES, CORNICES
Peck, Stow & Wilcox Co., Southington, Conn

BRASS FOUNDERS
Canada Metal Co., Toronto.
Greenleafs, Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal.
Tallman Brass & Metal Co., Hamilton.
Wilson & Co, J. C., Belleville, Ont.

BRASS WORKING MACHINERY
Foster Machine Co, Elkhart, Ind.
Garlock-Walker Machinery Co., Toronto.
Warner & Swasey Co., Cleveland, O.
Niles-Bement-Pond Co., New York.
Prest-O-Lite Co., Inc., Toronto, Ont.
Wood Turret Machine Co., Brazil, Ind.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

BRICKS, FIRE
Harbison-Walker Refractories, Montreal.

BRIDGES, RLY. AND HIGHWAY
Dominion Bridge Co, Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.

BRONZE RODS AND SHEETS, PLATES
Brown's Copper & Brass Rolling Mills, New Toronto.

BRONZE, NAVAL
Brown's Copper & Brass Rolling Mills, New Toronto.
Canada Metal Co., Toronto.
Tallman Brass and Metal Co., Hamilton.

BRONZE COPPER
Canada Metal Co., Toronto.

BUFFING AND POLISHING MACHINERY
Ford-Smith Mach. Co., Hamilton.
Foss Mchy. & S'ply Co., Geo. F. Montreal
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Limited, Montreal.

BUCKETS, DUMP
MacKinnon Steel Co., Sherbroooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

BUCKETS, ELEVATOR
Can Link-Belt Co, Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

BUCKETS, CLAM SHELL, CRAB, DUMP
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont
Northern Crane Works, Ltd, Walkerville.

BULLDOZERS
Bertram & Sons Co., John, Dundas.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Limited, Montreal.

BURNERS, OIL AND NATURAL GAS
Northern Crane Works, Ltd., Walkerville.

BURRS, IRON AND COPPER
Parmenter & Bulloch Co, Gananoque,.

BUSHINGS, BRONZE
Morrow Screw & Nut Co., John, Ingersoll.

CALIPERS
Brown & Sharpe Mfg. Co., Providence, R.I.
[illegible] Corporation, Hagerstown, Md.
Peck, Stow & Wilcox Co, Southington, Conn.

CABINETS, SAND BLAST
Pangborn Corporation, Hagerstown, Md.

CABLE, ELECTRIC
International Machinery & Supply Co, Ltd., Montreal, Que.

CALKS, BOOT
Lufkin Rule Co, of Can., Windsor Ont.

CANADA SILVER SHEETS, ROLLS
Brown's Copper & Brass Rolling Mills, New Toronto.

CANNERS' MACHINERY
Bliss E. W. Co, Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Can.

CANNERS' CONVEYORS
Can. Link-Belt Co, Toronto Ont
Wilson & Co, J. C, Belleville, Ont.

CARBIDE
Union Carbide Co., Toronto, Ont.

CARBONIZING BOXES
Can. Driver-Harris Co, Ltd., Walkerville
Katie Foundry, Galt, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.
Swedish Crucible Steel Co., Windsor.

CARRIERS, PNEUMATIC TUBE
Jones & Glassco, Montreal.

CARS, INDUSTRIAL
Can. Blower & Forge Co., Kitchener, Ont
Can. Fairbanks-Morse Co., Ltd, Montreal
Elec. Steel & Metals, Welland, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

CASTINGS, MACHINERY
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ALUMINUM, BRASS BRONZE, COPPER, AND GUN METAL
Algoma Steel Corp., Sault Ste. Marie.
Brockville Foundry Co., Brockville, Ont.
Franklin Mfg. Co., Syracuse, N.Y.
Canada Metal Co., Ltd., Toronto, Ont.

CASTINGS, DIE CAST
Canada Metal Co., Ltd., Toronto, Ont.
Franklin Mfg. Co., Syracuse, N.Y.

CASTINGS, STEEL—ALL KINDS
Electric Steel & Metals Co., Welland.

CARRIERS COUPLING BOLTS
John Morrow Screw & Nut Co., Ingersoll
Alexander Fleck, Ltd., Ottawa.
Greenleafs Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal.
Tallman Brass & Metal Co., Hamilton.

CASTINGS, BENCH LEG.
Brown & Sharpe Mfg. Co., Providence, R.I.

CASTINGS, BRASS AND IRON
Algoma Steel Corp, Sault Ste Marie.
International Machinery and Supply Co., Ltd., Montreal, Que.

CASTINGS, BUILDING
Katie Foundry, Galt, Ont.

CASTINGS, GRAY IRON
Bernard Industrial Co., A., Fortierville, Q.
Brown & Sharpe Mfg. Co., Providence, R.I.
Brown, Boggs Co, Ltd., Hamilton.
Alexander Fleck, Ltd., Ottawa.
Gardner & Son, Robt., Montreal.
Greenleafs, Ltd., Belleville, Ont.
Hull Iron & Steel Foundries, Ltd., Hull
International Malleable Iron Co., Guelph
Kennedy & Sons, Ltd., Wm., Owen Sound.
Katie Foundry, Ltd., Galt, Ont.
Hamilton Co., Wm., Peterboro.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, PLUMBERS'
Katie Foundry, Galt, Ont.

CASTINGS, NICHROME
Can. Driver-Harris Co., Ltd., Walkerville

CASTINGS, HARDWARE
Katie Foundry, Galt, Ont.

CASTINGS, STEEL CHROME AND MANGANESE STEEL
Thos. Davidson Mfg. Co., Montreal, Que.
Dom. Foundries & Steel, Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull.
Kennedy & Sons, Ltd, Owen Sound.

CASTINGS, MALLEABLE
International Malleable Iron Co., Guelph

CASTINGS, NICKEL STEEL
Hull Iron & Steel Foundries, Ltd., Hull.

CEMENT MACHINERY
Can. Fairbanks-Morse Co., Ltd., Montreal.
Gardner, Robt., & Son, Montreal.

CEMENT HANDLING MACHINERY
Can. Link-Belt Co., Toronto, Ont.

CENTERING MACHINES
Victoria Foundry Co., Ottawa, Ont.

CENTRE REAMERS
Bertram & Sons Co, John, Dundas
[illegible] Rock Island, Que.
Gardner Robt & Son, Montreal
H[illegible] Rogers Mch Co., South Sudbury, Mass.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co, Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

CHAIN, WELDED COIL
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

CHAIN BLOCKS
Aikenhead Hardware Co., Toronto, Ont
Can. Fairbanks-Morse Co., Ltd., Montreal
Ford Chain Block & Mfg. Co., Phila., Pa.
Garlock-Walker Machy. Co., Toronto.
Morris Crane & HoistCo., Herbert, Niagara Falls, Ont
Rice Lewis & Son, Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que
Jones & Glassco, Montreal, Que.

CHAINS, AGRICULTURAL
Morse Chain Co., Ithaca, New York.

CHAINS, AUTOMOBILE ENGINE
Morse Chain Co., Ithaca, New York.

CHAINS, BICYCLE, DRIVE AND BLOCK
Morse Chain Co., Ithaca, New York.

CHAINS, FOR ELEVATORS AND CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

CHAIN, MALLEABLE, DETACHABLE AND RIVETED
Can. Link-Belt Co., Toronto, Ont.
Morse Chain Co., Ithaca, N.Y.
Williams & Wilson Ltd., Montreal, Que.

CHAINS, POWER TRANSMISSION
Morse Chain Co., Ithaca, N.Y.

CHAINS, SPROCKET WHEEL
Morse Chain Co., Ithaca, N.Y.

CHAIN DRIVES
Can. Link-Belt Co., Toronto, Ont.
Coventry Chain Co., Coventry, England.
Jones & Glassco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.

CHASERS
National Acme Co., Cleveland, Ohio.
Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.

CHEMISTS
Toronto Testing Lab'tory, Ltd., Toronto

CHISELS
Whitman & Barnes Co., St. Catharines.

CHUCKS, AERO, AUTOMATIC
Garvin Machine Co., New York.

CHUCKS, COLLET, AIR
Elliott & Whitehall Mach. & Tool Co. Galt, Ont
Smalley-General Co., Inc., Bay City, Mich.
Williams & Wilson, Ltd., Montreal, Que.

CHUCKS, DRILL, LATHE AND UNIVERSAL
Aikenhead Hardware Co., Toronto, Ont.
Almond Mfg. Co., Ashburnham, Mass.
Bicknell-Thomas Co., Greenfield, Mass.
Bertram & Sons Co., John, Dundas.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Ltd, Montreal
Cushman Chuck Co., Hartford, Conn.
Foss Mchy. & S'ply Co., G. F., Montreal.
Gardner, Robt., & Son, Montreal.
Garlock-Walker Mach'y Co., Toronto.
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Chicago, Ill.
Jacobs Mfg Co, Hartford, Conn.
Modern Tool Co, Erie, Pa.
Rice Lewis & Son, Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Whiton Machine Co., D. E., New London, Conn.
Williams & Wilson, Ltd., Montreal, Que

CHUCKS, DRILL, AUTOMATIC AND KEYLESS
Aikenhead Hardware Co., Toronto, Ont
Bicknell-Thomas Co., Greenfield, Mass.
Can Blower & Forge Co., Kitchener.
Whitney Mfg. Co., Hartford, Conn.

CHUCKS, FRICTION AND TAP
Bicknell-Thomas Co., Greenfield, Mass.
Victor Tool Co., Waynesboro, Pa.

CHUCKS, MAGNETIC
Heald Machine Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

CHUCKS, RING WHEEL
Ford-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.

CHUCKING MACHINES
Brown & Sharpe Mfg. Co., Providence, R.I.
Garvin Machine Co., New York.
Gisholt Machine Co., Madison, Wis.
National Acme Co., Windsor, Vt.
Niles-Bement-Pond Co., New York.
Roelofson Machine & Tool Co., Toronto.
Warner & Swasey Co, Cleveland, O.
Wood Turret Mach Co Brazil, Ind.
Williams & Wilson, Ltd, Montreal, Que

CIRCULATING SYSTEMS FOR LUBRICATING OIL
[illegible]
Williams & Co., J. H., Brooklyn, N.Y.

CLEANING COMPOUND
Oakley Chemical Co., New York.

CLOCK SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

CLOCKS, WATCHMAN, PORTABLE
Gisholt Machine Co, Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.

CLUTCHES, CHAIN
Wright Mfg. Co., Lisbon, Ohio.

CLUTCHES, FRICTION AND PULLEY
Bernard Industrial Co., A., Fortierville, Q.
Can Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mach. Co., Manchester, Conn.
Jones & Glassco, Montreal, Que.
Williams & Wilson, Ltd., Montreal, Que.

COAL HANDLING MACHINERY
Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal.

Nova Scotia Steel & Coal Co., New Glasgow, N.S.

COLD ROLLED STRIP, ALL METAL COLLARS, SHAFTING
Can. Driver-Harris Co., Ltd., Walkerville
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

COLLECTORS, PNEUMATIC
Can. Blower & Forge Co., Kitchener.
J. C. Wilson & Co., Belleville, Ont.

COLLETS
Becker Milling Machine Co., Boston.
Hardinge Bros., Inc., Chicago, Ill.
Wilson & Co., J. C. Belleville, Ont.

COMPOSITION INGOT
Brown's Copper & Brass Rolling Mills, New Toronto.
Canada Metal Co., Toronto, Ont.

COMBINED OPEN SIDE PLANER-SHAPER
Lynd-Farquhar Co., Boston, Mass.

COMPRESSORS, AIR
Can. Ingersoll-Rand Co., Sherbrooke.
Cleveland Pneumatic Tool Co., Toronto.
Curtis Pneumatic Machy. Co., St. Louis
Garlock-Walker Machy. Co., Toronto.
Hinckley Machine Co., Hinckley, Ill.
MacGovern & Co., Montreal, Que.
Williams & Wilson, Ltd., Montreal, Que

CONDENSERS
MacGovern & Co., Montreal, Que.
Smalley-General Co., Inc., Bay City, Mich.

CONNECTING RODS
Canada Found's & Forgings, Ltd., Welland, Ont.

CONTRACT WORK
Brown Engineering Corp., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.
Homer & Wilson, Hamilton, Ont.
Katie Foundry, Ltd., Galt, Ont.
Marten Machine Co., Hamilton, Ont.
St. Lawrence Welding Co., Montreal.
Victoria Foundry Co, Ottawa.
Wilson & Co., J. C., Belleville, Ont.
Windsor Mach. Tool Co., Windsor, Ont.

CONTROLLERS, MAGNETIC BRAKES, ELEC. WINCHES, MONO RAIL HOISTS
Volta Mfg. Co., Welland, Ont.

CONTROLLERS AND STARTERS
Williams Mach'y Co., A. R., Toronto.

CONTROLLING INSTRUMENTS
Taylor Instrument Co., Rochester, N.Y.

CONVERTERS, ROTARY
MacGovern & Co., Montreal, Que.

CONVEYORS, BELT AND CHAIN
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

COOLERS, WITH DRINKING FOUNTAINS
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

COPING MACHINES
Bertram & Sons Co, John, Dundas, Ont.
Garlock-Walker Machinery Co., Toronto.
Niles-Bement-Pond Co., New York.
Can. Blower & Forge Co., Kitchener.

COPPER, BUS BAR, SHEET, PATES, RODS
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

COTTER PINS
Whitman & Barnes Co., St. Catharines.

COUNTERBORES AND COUNTERSINKS
Aikenhead Hardware Co., Toronto, Ont.
Blancke Co., L. C., New York City.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

COUNTERSHAFTS
Almond Mfg. Co., Ashburnham, Mass.
Brown & Sharpe Mfg. Co., Providence, R.I.
Gray Ball Bearing Co., Ltd., Toronto.
Baird Machine Co., Bridgeport, Conn.
Ford-Smith Machine Co., Hamilton, Ont.
Foster Machine Co., Elkhart, Ind.
Williams & Wilson, Ltd., Montreal, Que.

COUPLINGS, FRICTION
Bernard Industrial Co., The A., Fortierville, Que.
Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que

COUPLINGS, RAPID HOSE
Int. Machinery & Supply Co., Ltd., Montreal, Que.

COILING MACHINERY, WIRE AND SPRING
Garlock-Walker Machinery Co., Toronto.

COKE AND COAL
Hanna & Co., M. A., Cleveland, O.

COUPLINGS, PLAIN, FLEXIBLE AND CUT OFF
Cleveland Pneumatic Tool Co., of Canada, Toronto.
Gardner, Robt. & Son, Montreal.
Independent Pneumatic Tool Co., Chicago
Wilson & Co., J. C., Belleville, Ont.

CRANES, LOCOMOTIVE
Can. Link-Belt Co., Toronto, Ont.
Northern Crane Works, Walkerville.

CRANES, OVERHEAD, HAND AND ELECTRIC
Volta Manufacturing Co., Welland, Ont.

CUPS, OIL
Can. Winkley Co., Ltd., Windsor, Ont.

COVERS, OIL HOLE
Can. Winkley Co., Ltd., Windsor, Ont.

CRANES, GANTRY
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.

CRANE RUNWAYS
MacKinnon Steel Co., Sherbrooke, Que.

CRANES, GOLIATH, PNEUMATIC AND PORTABLE
Morris Crane and Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Wilson & Co., J. C., Belleville.
Williams & Wilson, Ltd., Montreal, Que.

CRANES, TRAVELLING, ELECTRIC AND HAND POWER
Can. Link-Belt Co., Toronto, Ont.
Curtis Pneumatic Machy. Co., St. Louis.
Dominion Bridge Co., Montreal.
Hepburn, John T., Ltd., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Niles-Bement-Pond Co., New York.
Northern Crane Works, Walkerville.

CRANK SHAFTS
Canada Found's & Forgings Ltd., Welland
Williams & Co., J. H., Brooklyn, N.Y.

CRANES, PORTABLE
Aikenhead Hardware Co., Toronto, Ont.
Can. Link-Belt Co., Toronto.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Rice Lewis & Son, Toronto, Ont.
J. C. Wilson & Co., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CRIMPS, LEATHER
Graton & Knight Mfg. Co., Worcester, Mass.

CRUSHERS
Elec. Steel & Metals, Welland, Ont.

CUPOLAS
Can. Blower & Forge Co., Kitchener.
Northern Crane Works, Walkerville.

CURB PUMPS FOR OIL, GASOLINE
Bowser Co., Ltd., S. F., Toronto, Ont.

CURRENT TRANSFORMERS
Volta Manufacturing Co., Welland, Ont.

CUT-OFF COUPLINGS, FRICTION
J. C. Wilson & Co., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CUTTERS, BOLT
See Bolt Cutters.

CUTTFRS. GFARS
Brown & Sharpe Mfg. Co., Providence, R.I.
Butterfield & Co., Inc., Rock Island, Que.
Fellows Gear Shaper Co., Sprinfigeld, Vt.

CUTTERS. FLUE
Cleveland Pneumatic Tool Co., Toronto.

CUTTER HEADS
Oliver Machinery Co., Grand Rapids, Mich.

CUTTERS, PIPE (See Pipe Cutters)

CUTTERS, MILLING
Becker Milling Mach. Co., Boston, Mass.
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Ltd., Montreal
Cleveland Twist Drill Co., Cleveland.
Davidson Tool Mfg. Co., New York, N.Y.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garvin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
Morse Twist Drill & Machine Co., New Bedford.
Pratt & Whitney Co., Dundas, Ont.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Tabor Mfg. Co., Philadelphia, Pa.
Whitney Mfg. Co., Hartford, Conn.

CUTTING-OFF MACHINES
Armstrong Bros., Tool Co., Chicago.
Bertram & Sons Co., John, Dundas.
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Ltd., Montreal
Curtis & Curtis Co., Bridgeport, Conn.
Foss Mchy. & S'ply Co., Geo. F., Montreal
Garlock-Walker Machinery Co., Toronto
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield, Mass.

Hurlburt, Rogers Machy. Co., South Sudbury, Mass.
Hall & Sons, John H., Brantford, Ont.
Kennedy & Sons, Wm., Owen Sound.
Niles-Bement-Pond Co., New York, N.Y.
Peerless Machine Co., Racine, Wis.
Prest-O-Lite Co., Inc., Toronto, Ont.
Racine Tool & Machine Co., Racine, Wis.
Tabor Mfg. Co., Philadelphia, Pa.
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

CUTTING COMPOUND AND CUTTING OIL
Cataract Refining Co., Ltd., Toronto.

CUTTING OIL, RECLAIMING SYSTEM
Bowser Co., Ltd., S. F., Toronto, Ont.

CUTTING AND WELDING PLANTS
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

CYANIDE AND LEAD BATH POTS
Swedish Crucible Steel Co., Windsor.

CYLINDERS, AIR
Ford-Smith Machine Co., Hamilton, Ont.
Smalley General Co., Inc., Bay City, Mich

CYLINDERS, AUTOMATIC REBORING JIGS AND REAMERS
Hinckley Machine Co., Hinckley, Ill.
Kelley Reamer Co., Cleveland, O.

DERRICKS
Aikenhead Hardware Co., Toronto, Ont.
Dominion Bridge Co., Montreal.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

DIAMOND TOOLS
Ford-Smith Machine Co., Hamilton, Ont.
Joyce-Koebel Co., Inc., New York City.
Wheel Trueing Tool Co., Detroit.
Williams & Wilson, Limited, Montreal.

DIAMONDS, CARBON AND BORTZ
Wheel Trueing Tool Co., Detroit

DIAMONDS, BLACK AND ROUGH
Joyce, Koebel & Co., Inc., New York.
Wheel Trueing Tool Co., Windsor, Ont.

DIE BLOCKS
General Steel Co., Milwaukee, Wis.

DIE HEADS, AUTOMATIC
Greenfield Tap & Die Corp., Greenfield Mass.
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

DIES, BRASS PRINTING, EMBOSSING AND LETTERING
Matthews, Jas. H., & Co., Pittsburgh, Pa

DIES FOR BIT BRACE USE
Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Wells Brothers Co., of Canada, Galt.

DIES AND DIE STOCKS
Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Brown, Boggs Co., Hamilton, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Gardiner, Robt. & Son, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Marshall, Son & Bunney, Toronto.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
National Acme Co., Cleveland, Ohio.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Rickert Shafer Co., Erie, Pa.
Stoll Co., Inc., D. H., Buffalo, N.Y.
Wells Brothers of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que

DIES, PIPE THREADING
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Williams & Wilson, Ltd., Montreal, Que.

DIES, THREADING
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

DIE SINKERS
Becker Milling Machine Co., Boston
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.

DIES FOR MACHINES
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Rock Island, Que.
Firth & Sons, Thos., Montreal, Que.
Landis Machine Co., Waynesboro, Pa.
Wells Brothers Co. of Canada, Galt.

DIE HEADS
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Canada, Galt, Ont.

DIES, SELF-OPENING
Geometric Tool Co., New Haven
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
Wells Brothers Co. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

DIE FILING MACHINES
Oliver Mach. Co., Grand Rapids, Mich.

DIE STEEL, HOT AND COLD WORK
Armstrong-Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney, Toronto.
Firth & Sons, Thos., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

DIES FOR SCREW PLATES
Butterfield & Co., Inc., Rock Island, Que
Wells Bros. Co. of Can., Galt, Ont.

DIES, SHEET METAL WORKING
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Stoll Co., D. H., Buffalo, N.Y.

DIES, SCREW AND THREAD
Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
National-Acme Co., Cleveland, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co., of Can., Galt, Ont.

DISCS, LEATHER, STEEL
Graton & Knight Mfg. Co., Worcester, Mass.
Swedish Steel & Importing Co., Montreal.

DIRECT CONNECTED UNITS
MacGovern & Co., Montreal, Que.

DRAFT, MECHANICAL
W. H. Banfield & Sons, Toronto.
Butterfield & Co., Rock Island, Que.
Can. Blower & Forge Co., Kitchener.
A. B. Jardine & Co., Hespeler, Ont.
Pratt & Whitney Co., Dundas, Ont.

DRESSERS, GRINDING AND EMERY WHEEL
Can. Desmond-Stephan Mfg. Co., Hamilton
Wheel Trueing Tool Co., Windsor, Ont.
Williams & Wilson, Limited, Montreal

DRILL PRESSES
Aurora Tool Works, Aurora, Ind.
W. F. & John Barnes Co., Rockford.
Can. Blower & Forge Co., Kitchener.
Canada Machinery Corp., Galt, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machinery Co., Toronto
Garvin Machine Co., New York.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Niles-Bement-Pond Co., New York.
U. S. Mach. Tool Co., Cincinnati, Ohio.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILL RODS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.
Swedish Steel & Importing Co., Ltd., Montreal.

DRILLING MACHINES, GANG
Barnes, W. F. & John, Co., Rockford, Ill.
Bilton Mach. Tool Co., Bridgeport, Conn
Canada Machinery Corp., Galt, Ont.
Silver Mfg. Co., Salem, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

DRILLING MACHINES, LOCOMOTIVE AND MULTIPLE SPINDLE
John Bertram & Sons Co., Dundas.
Bilton Mach. Tool Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Mach. Co., Toronto.
Garvin Machine Co., New York.
Hoefer Mfg. Co., Freeport, Ill.
Henry & Wright Mfg. Co., Hartford, Conn
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
Nat. Automatic Tool Co., Richmond, Ind.
Niles-Bement-Pond Co., New York.
Rockford Drilling Mach Co., Rockford, Ill

DRILLING MACHINES, RADIAL AND TURRET
John Bertram & Sons Co., Dundas.
Canadian Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Henry & Wright Mfg. Co., Hartford,
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal

DRILLING MACHINES, SENSITIVE
Bilton Mach. Tool Co., Bridgeport, Conn.
W. F. & John Barnes Co., Rockford, Ill.
Canadian Fairbanks-Morse Co., Montreal.
Canadian Machinery Corp., Galt, Ont.
Geo. F. Foss Mch. & S'ply Co., Montreal
Garlock-Walker Mach. Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati
Williams & Wilson, Limited, Montreal,

DRILLING MACHINES UPRIGHT AND HORIZONTAL
Aurora Tool Works, Aurora, Ind.
John Bertram & Sons Co., Dundas.
Garlock-Walker Mach. Co., Toronto, Ont
Can. Blower & Forge Co., Kitchener.
Canada Mach. Corp., Galt, Ont.

Ford-Smith Machine Co., Hamilton, Ont.
Garlock-Walker Mach. Co., Toronto, Ont.
Hoefer Mfg. Co., Freeport, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
R. McDougall Co., Galt.
Nat. Automatic Tool Co., Richmond, Ind.
Rockford Drilling Mach. Co., Rockford, Ill
Niles-Bement-Pond Co., New York.
Silver Mfg. Co., Salem, Ohio.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILLING MACHINES, SPECIAL
Hoefer Mfg. Co., Freeport, Ill.

DRILLING MACHINES, WALL RADIAL
Lynd-Farquhar Co., Boston, Mass.
Wickes Bros., Saginaw, Mich.

DRILLING POSTS
Aikenhead Hardware Co., Toronto, Ont.
Keystone Mfg. Co., Buffalo, N.Y.
Rice Lewis & Son, Toronto, Ont.
Silver Mfg. Co., Salem, Ohio.

DRILLS, BENCH
Aikenhead Hardware Co., Toronto.
W. F. & John Barnes Co., Rockford, Ill
Can. Blower & Forge Co., Kitchener.
Can. Fairbanks-Morse Co., Montreal.
Geo. F. Foss Mch. & S'ply Co., Montreal
Fry's (London), Ltd., London, England
Garlock-Walker Machinery Co., Toronto.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
U.S. Electrical Tool Co., Cincinnati, O.
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, CENTRE
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Machine Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co., of Can., Walkerville
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, BLACKSMITH AND BIT STOCK
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que
Can. Blower & Forge Co., Kitchener.
Cleveland Twist Drill Co., Cleveland.
Geo. F. Foss Mch. & S'ply Co., Montreal
A. B. Jardine & Co., Hespeler, Ont.
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont
Wilt Twist Drill Co. of Can., Walkerville

DRILLS, CARBON
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que
Marshall, Son & Bunney, Toronto.
John Morrow Screw & Nut Co., Ingersoll

DRILLS, ELECTRIC, PORTABLE
Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener.
Boker & Co., Inc., H., Montreal, Que.
Cincinnati Electrical Tool Co., Cincinnati
Geo. F. Foss Mch. & S'ply Co., Montreal
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York
Pilot Steel & Tool Co., Montreal, Que.
Prest-O-Lite Co., Inc., Toronto, Ont.
U. S. Electrical Tool Co., Cincinnati, O.
A. R. Williams Mach. Co., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, EMERY
Garlock-Walker Mach. Co., Toronto, Ont.

DRILLS, HIGH SPEED TWIST
Aikenhead Hardware Co., Toronto, Ont.
Armstrong-Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Canadian Fairbanks-Morse Co., Montreal
H. A. Drury Co., Montreal.
Geo. F. Foss Mch. & S'ply Co. Montreal
Marshall, Son & Bunney, Toronto.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Machine Co., New Bedford, Mass.
W. F. & John Barnes Co., Rockford, Ill
Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Taylor J. A. M., Stair Bldg., Toronto.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que

DRILLS, OIL TUBE
Butterfield & Co., Inc., Rock Island, Que
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.

DRILLS, PNEUMATIC
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal.

DRILLS, PNEUMATIC CORNER
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.

DRILLS, RATCHET AND HAND
Aikenhead Hardware Co., Toronto, Ont.
Armstrong Bros. Tool Co., Chicago, Ill.
Can Blower & Forge Co., Kitchener, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cincinnati Electrical Tool Co., Cincinnati.
Cleveland Twist Drill Co., Cleveland.
Garlock-Walker Mchy. Co., Toronto, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville.

DRILLS, ROCK
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
The Foss Mchy. & Supply Co., Montreal.
A. R. Williams Machy. Co., Toronto.

DRILLS, TRACK
Butterfield & Co., Inc. Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
The Foss Mchy. & Supply Co., Montreal.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Wilt Twist Drill Co. of Can., Walkerville.

DRINKING FOUNTAINS, SANITARY
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

DRIVES, CHAIN
See Belting, Chain.

DRIVING TOOLS
The Thos. Pink Co., Ltd., Pembroke, Ont.

DRY CLEANING SYSTEM
Bowser Co., Ltd., S. F., Toronto, Ont.

DRYERS, SAND
Pangborn Corporation, Hagerstown, Md.

DRYING APPLIANCES
Baird Machine Co., Bridgeport, Conn.

DRUM CONTROLS
Volta Manufacturing Co., Welland, Ont.

DUMP CARS
Canadian Fairbanks-Morse Co., Montreal.
MacKinnon Steel Co., Sherbrooke, Que.

DUST EXHAUSTER. ARRESTER SYSTEM
Pangborn Corporation, Hagerstown, Md.

DUST HANDLING EQUIPMENT
Pangborn Corporation, Hagerstown, Md.

DUST SEPARATORS
Can. Blower & Forge Co., Kitchener, Ont.

DYNAMOS AND ELECTRICAL SUPPLIES
Canadian Fairbanks-Morse Co., Montreal.
Lancashire Dynamo & Motor Co., Ltd., Toronto
MacGovern & Co., Montreal, Que.
A. R. Williams Machy. Co., Toronto.

ELECTRICAL SUPPLIES
Can. General Electric Co., Toronto, Ont.

ELECTRIC FURNACES
Volta Manufacturing Co., Welland, Ont.

EECTRIC FURNACE REGULATORS, WINCHES, ROOF COOLERS AND ELECTRODE HOLDERS
Volta Manufacturing Co., Welland, Ont.

ELECTRICAL RESISTANCE MATERIALS, NICHROME, KROMORE, CHROMAX, CLIMAX, NICKEL, SILVER, ADVANCE.
Can. Driver-Harris Co., Walkerville, Ont.

ELECTRIC HOISTS, STATIONARY AND MONO RAIL
Volta Manufacturing Co., Welland, Ont.

ELECTRIC MOTORS
Volta Manufacturing Co., Welland, Ont.

ELEVATOR, ENCLOSURES
Volta Mfg. Co., Welland, Ont.
Canada Wire & Iron Goods Co., Hamilton

ELEVATOR WEIGHTS
Kelly Foundry, Galt, Ont.

ELEVATORS AND BUCKETS
Can. Link-Belt Co., Toronto, Ont.
Curtis Pneumatic Machy. Co., St. Louis
Williams & Wilson, Ltd., Montreal, Que.

ELEVATING AND CONVEYING MACHINERY
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Williams & Wilson, Ltd., Montreal, Que.

EMBOSSING PRESSES
Oliver Machinery Co., Grand Rapids, Mich

EMERY GRINDERS (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.

EMERY AND EMERY WHEELS
Brantford Emery Wheel Co., Brantford, Canada
The Foss Mchy. & Supply Co., Montreal.
Garvin Machine Co., New York.
Canadian Fairbanks-Morse Co., Montreal.
Canada Emery Wheels Co., Hamilton.
Ford-Smith Mach. Co., Hamilton, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Wilkinson & Kompass, Hamilton, Ont
Williams & Wilson, Ltd., Montreal, Que.

EMERY WHEEL DRESSINGS
Wheel Trueing Tool Co., Windsor, Ont.

END MILLS
John Morrow Screw & Nut Co., Ingersoll

ENGINES, STEAM, GAS, GASOLINE
Canadian Fairbanks-Morse Co., Montreal.
Johnson Mach. Co., Carlyle, Manchester, Conn.
MacGovern & Co., Montreal, Que.

ENGINES, HORIZONTAL AND VERTICAL
Johnson Mach. Co., Carlyle, Manchester, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

ENGINES, MARINE
Can. Ingersoll-Rand Co., Sherbrooke, Que.

ENGRAVERS
Pritchard-Andrews Co., Ottawa.

ESCUTCHEON PINS
Parmenter & Bulloch, Gananoque, Ont.

EXHAUST HEADS AND HOODS
Can. Blower & Forge Co., Kitchener, Ont.
Canadian Fairbanks Morse Co., Montreal.

EXHAUSTERS
Can. Blower & Forge Co., Kitchener, Ont.
Pangborn Corporation, Hagerstown, Md.
Williams & Wilson, Ltd., Montreal, Que.

EXTRACTORS, TAP
Walton Co., The, Hartford, Conn.

EYE BOLTS AND NUTS
Can. Foundries & Forgings, Ltd., Welland, Ont.

EYE PROTECTORS
Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

FACTORY GATES
Page Steel & Wire Co., Adrian, Mich.

FANS
Baird Machine Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont.

FENCING, WIRE
Page Steel & Wire Co., New York, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

FENCE, IRON AND FACTORY
Can. Wire & Iron Goods, Hamilton, Ont.
Page Steel & Wire Co., Adrian, Mich.

FERRO-TUNGSTEN
Vanadium-Alloys Steel Co., Pittsburgh, Pa

FILES
Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Wm., Sheffield, Eng.
Ingersoll File Co., Ltd., Ingersoll, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Marshall Son & Bunney, Toronto, Ont.
Nicholson File Co., Port Hope, Ont.
Rice Lewis & Son, Toronto, Ont.
Simonds Mfg. Co., Fitchburg, Mass.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont.

FILTERING AND CIRCULATING SYSTEMS FOR LUBRICATING OIL
Bowser Co., Ltd., S. F., Toronto, Ont.
Can. Wire & Iron Goods, Hamilton, Ont.

FINISHING MACHINES
Brown & Sharpe Mfg. Co., Providence, R.I.

FIRST AID CABINETS
Strong, Kennard & Nutt Co., Cleveland

FIRE EXTINGUISHERS
Strong, Kennard & Nutt Co., Cleveland, O.

FIXTURES
Brown Engineering Corp., Toronto, Ont.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ontario.
Toronto Tool Co., Toronto, Ont.

FLAT SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

FLANGING CLAMPS
Wickes Bros., Saginaw, Mich

FLOTATION MACHINERY
Elec. Steel & Metals, Welland, Ont.

FLUMES
William Hamilton Co., Peterboro, Ont.

FORGES, HAND PORTABLE
Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.

FORGINGS, STEEL AND IRON
Blancke Co., L. C., New York City.
Can. Found. & Forgings, Ltd., Welland.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

FORGINGS, DROP, AUTOMOBILE AND LOCOMOTIVE FORGING AND WELDING
Blancke Co., L. C., New York City.
Dominion Bridge Co., Montreal, Que.
Dom. Forge & Stamping Co., Walkerville.
Steel Co. of Canada, Ltd., St. Catharines.
Victoria Foundry Co., Ottawa.
Williams & Co., J. H., Brooklyn, N.Y.

FORGING MACHINERY
John Bertram & Sons Co., Dundas, Ont.
Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
National Machy. Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

FORGINGS, SPECIAL
Armstrong-Whitworth of Can., Montreal.
Blancke Co., L. C., New York City.
Can. Found. & Forgings, Ltd., Welland.
Williams & Co., J. H., Brooklyn, N.Y.

FORMING
Brown & Sharpe Mfg. Co., Providence, R.I.

FOUNTAINS, DRINKING
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

FRICTION LEATHERS
Graton & Knight Mfg. Co., Montreal.

FRICTION SURFACE BELTING
Can. Consolidated Rubber Co., Montreal.

FUEL OIL SYSTEMS
Bowser Co., Ltd., S. F., Toronto, Ont.
Gilbert & Barker Mfg. Co., Springfield.

FURNACES, ANNEALING, CASE HARDENING AND TEMPERING
Bellevue Furnace Co., Detroit, Mich.
Brown & Sharpe Mfg. Co., Providence, R.I.
Chicago Flexible Shaft Co., Chicago, Ill.
Gilbert & Barker Mfg. Co., Springfield.
Mechanical Eng'r'g Co., Three Rivers, Q.
Standard Fuel Engr. Co., Detroit, Mich.
Williams & Wilson, Ltd., Montreal, Que.

FURNACES, BLAST
Bellevue Industrial Furnace Co., Detroit.
Toronto Iron Works, Ltd., Toronto.

FURNACES, FORGING
Gilbert & Barker Mfg. Co., Springfield.

FUSE BOXES, STEEL
Dom. Forge & Stamp. Co., Walkerville.

GANG PLANER TOOLS
Armstrong Bros. Tool Co., Chicago.

GASKETS, LEATHER, ETC.
Graton & Knight Mfg. Co., Montreal.

GASOLINE METERS
Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE TANKS
Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE PUMPS, SELF-MEASURING
Bowser Co., Ltd., S. F., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.

GAUGES
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.

GAUGERS, CALIPERS
Williams & Co., J. H., Brooklyn, N.Y.

GAUGES, MERCURY COLUMN, DRAFT
Taylor Instrument Co., Rochester, N.Y.

GAUGES, HYDRAULIC
Taylor Instrument Co., Rochester, N.Y.

GAUGES, MANUFACTURERS, LIMIT, THREAD
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Can., Galt, Ont.

GAUGES, STANDARD
Brown Engineering Corp., Toronto, Ont
Canadian Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Garvin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
C. E. Johanson, Inc., Toronto, Ont.
Morse Twist Drill & Machine Co., New Bedford.
Peck, Stow & Wilcox Co., Southington, Conn.
Pratt & Whitney Co., Hartford, Conn.
Taylor, J. A. M., 318 Stair Bldg., Toronto
Toronto Tool Works, Toronto, Ont.
Wells Brothers Co. of Canada, Galt, Ont.
Worth Engineering Co., Toronto, Ont.

GAUGES, THREAD
Bicknell-Thomas Co., Greenfield, Mass.

GAUGES, VACUUM AND PRESSURE
Bristol Co., Waterbury, Conn.
Taylor Instrument Co., Rochester, N.Y.

GAUGES, SNAP, THREAD AND CYLINDRICAL
C. E. Johanson, Inc., Toronto, Ont.

GEAR BLANKS
Can. Steel Foundries, Ltd., Montreal.
Dom. Found. & Steel, Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

GEAR BLANKS, CAST
Katie Foundry, Galt, Ont.

GEAR SHAPERS AND CUTTERS
Fellows Gear & Shaper Co., Springfield, V.

GEAR-CUTTING MACHINERY
Bilton Mach. Tool Co., Bridgeport, Conn.
Fellows Gear & Shaper Co., Springfield, V.
Garlock-Walker Mchy. Co., Toronto, Ont.
D. E. Whiton Machine Co., New London, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

GEAR-TESTING MACHINE
Gisholt Machine Co., Madison, Wis.

GEAR-TURNING MACHINES, BEVEL
Bridgeford Mach. Tool Wks, Rochester

GEAR BOXES, REDUCTION
Coventry Chain Co., Coventry, Eng.

GEARS, CHAIN
Morse Chain Co., Ithaca, New York.

GEARS, COMPENSATING
Morse Chain Co., Ithaca, New York.

GEARS, CUT, MORTISE, ANGLE, WORM
Baxter & Co., Ltd., J. R., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Dom. Foundries & Steel, Hamilton, Ont.
Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Hull Iron & Steel Found., Ltd., Hull, Q.
Illinois Tool Works, Chicago, Ill.
Jones & Glassco, Montreal.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Philadelphia Gear Works, Philadelphia
Victoria Foundry Co., Ottawa.
Wilson & Co., J. C., Belleville, Ont.

GEARS, RAWHIDE
Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Jones & Glassco, Montreal.
Philadelphia Gear Works, Philadelphia
A. R. Williams Machy. Co., Toronto.

GENERATORS, GEAR
Fellows Gear & Shaper Co., Springfield, V.

GEARS, SPRING
Morse Chain Co., Ithaca, New York.

GEARS, SPUN, BENCH, SPIRAL
Brown & Sharpe Mfg. Co., Providence, R.I.

GEARS, SILENT CHAIN GENERATORS, STEAM TURBO
Can. General Electric Co., Toronto, Ont.

GENERATORS AND CONVERTORS
Can. General Electric Co., Toronto, Ont.

GENERATORS, MOTOR
A. R. Williams Machy. Co., Toronto
Williams & Wilson, Ltd., Montreal.
MacGovern & Co., Montreal.

GERMAN SILVER
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

GLOVES, ASBESTOS, ACID PROOF, WATERPROOF, ETC.
Strong, Kennard & Nutt Co., Cleveland.

GLUE HEATERS
Oliver Machinery Co., Grand Rapids, Mich

GLASSES, SAFETY
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

GOVERNOR, WATER WHEEL
Wilson & Co., J. C., Belleville, Ont.

GRAPHITE
Aikenhead Hardware, Ltd., Toronto.
Rice Lewis & Son, Toronto.

GOGGLES
Consolidated Optical Co., Toronto.
Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.
Welding & Supplies Co., Montreal.

GRAVITY CARRIERS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

GREASE CUPS, PRESSED STEEL, BRASS
Can. Winkley Co., Ltd., Windsor, Ont.

GREASES (See Lubricants)

GRINDERS, AUTOMATIC KNIFE
Canada Machinery Corp., Galt, Ont.
Foss Mchry. & S'ply Co., G. F., Montreal
Garlock-Walker Machinery Co., Toronto.

GRINDERS, CENTRE COLUMN, PEDESTAL AND BENCH
Wisconsin Electric Co., Inc., Racine, Wis.
Can. Machinery Corp., Galt, Ont.

How The Gear Shaper Cuts Accurate Gears

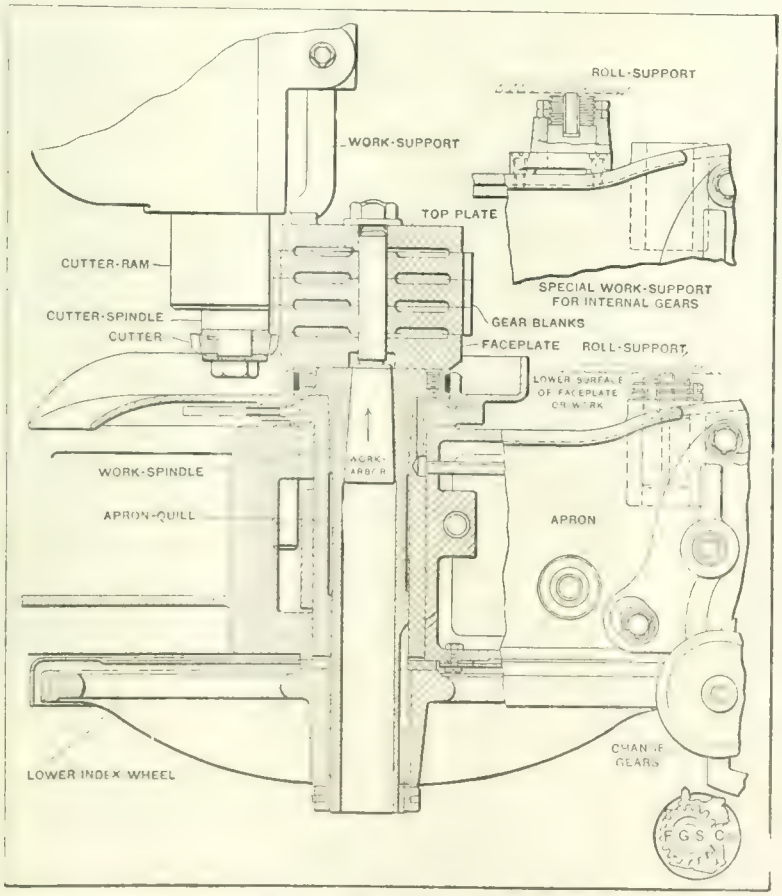
The cutting of accurate gears is not only a question of having an accurate machine and an accurate cutter, but is also a question of the proper application of basic principles in the machine itself.

Gears in which the teeth are not cut concentric with the holes are inaccurate. They are also noisy in operation.

Spur gears in which the teeth do not lie exactly parallel with the axis are also inaccurate and noisy.

In order, therefore, to cut accurate gears, it is necessary that the gears being cut be accurately and rigidly held.

The Gear Shaper method of supporting gears is unique in that the work can be clamped rigidly without springing the work-arbor; also the cutter does not deflect the work when the teeth are being generated.



Section through work-spindle showing rigid method of holding and supporting Gear Blank.

The accompanying diagram illustrates this point very clearly. The work, it will be noticed, is clamped rigidly to a face-plate. All the arbor does is simply to center the work accurately and furnish the clamping medium.

The tighter the work is clamped, the more rigidly the arbor is held in the spindle, because it has a reverse taper. There is, therefore, no possibility of deflecting the work in cutting, as is the case with other processes where the work is supported by a long slender arbor.

One of the chief advantages of this unique method of supporting the work is that the work can be cut much faster and with a greater degree of accuracy than is possible by any other method.

It will pay you to investigate the many advantages of the Gear Shaper method of cutting gears, which is fully explained in the sixth edition of our general catalogue "Commercial Gear Cutting," copies of which are ready for general distribution to those interested. Simply send your request to—

The Fe s Gear Shaper Company

Springfield, Vermont, U.S.A.

FOREIGN AGENTS—Alfred Herbert, Limited, Coventry, England; Societe Anonyme Alfred Herbert, 17 Boulevard de Magenta, Paris, France; Societa Anonima Italiana Alfred Herbert, 42 via Cajazzo, Milan, Italy; Alfred Herbert, Limited, 14 Yamashita-cho, Yokohama, Japan; Societe Anonyme Alfred Herbert, Calle de Mallorca No. 270, Barcelona, Spain; Societe Anonyme Belge Alfred Herbert, 35 Rue de Laekin, Brussels, Belgium; Alfred Herbert, Limited, 13 British India Street, Calcutta, India; and A. B. Galco, Limited, Stockholm, Sweden.

Cleveland Pneumatic Tool Co., Toronto.
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Garlock-Walker Machinery Co., Toronto.
Katie Foundry, Galt, Ont.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Machine Co., New Bedford.
Niles-Bement-Pond Co., New York, N.Y.
Perfect Machine Co., Galt, Ont.
United States Elec. Tool Co., Cincinnati.
Williams & Wilson, Limited, Montreal.

GRINDERS, CUTTER
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati Milling Mach. Co., Cincinnati.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Garvin Machine Co., New York.
Greenfield Machine Co., Greenfield, Mass.
Greenfield Tap & Die Corp., Greenfield, M.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Can., Galt, Ont.
Williams & Wilson, Ltd., Montreal.

GRINDERS, DIE AND CHASER
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.

GRINDERS, DISK
Armstrong Bros. Tool Co., Chicago, Ill.
Ford-Smith Mach. Co., Hamilton.
Gardner Machine Co., Beloit, Wis.
Heald Machine Co., Worcester, Mass.

GRINDERS, DRILL
Aikenhead Hardware Co., Toronto.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield.
United States Elec. Tool Co., Cincinnati.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal.

GRINDERS, CYLINDER, INTERNAL
Brown & Sharpe Mfg. Co., Providence, R.I.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Greenfield Machine Co., Greenfield, Mass.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDERS, PORTABLE, ELECTRIC, HAND, TOOL POST, FLOOR AND BENCH
Baird Machine Co., Bridgeport, Conn.
Brown & Sharpe Mfg Co., Providence, R.I.
Cincinnati Electrical Tool Co., Cincinnati.
Ford-Smith Mach. Co., Hamilton, Ont.
Wisconsin Electric Co., Inc., Racine, Wis.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Grant Mfg. & Mach. Co., Bridgeport, Conn.
Garlock-Walker Machinery Co., Toronto.
Greenfield Machine Co., Greenfield, Mass.
Independent Pneumatic Tool Co., Chicago.
United States Elec. Tool Co., Cincinnati.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal.
Wilkinson & Kompass, Hamilton, Ont.

GRINDERS, MANUFACTURING
Universal Grinding Mach. Co., Fitchburg, Mass.

GRINDERS, HOLE, HOLE AND FACE AND DEEP HOLE
Bryant Chucking Grinder Co., Springfield, Vermont.
Heald Machine Co., Worcester, Mass.

GRINDERS, PLAIN CYLINDRICAL
Fitchburg Grinding Mach. Co., Fitchburg, Mass.

GRINDERS, PNEUMATIC
Can. Ingersoll-Rand Co., Montreal.
Cleveland Pneumatic Tool Co., Toronto.
Garlock-Walker Machinery Co., Toronto.
Heald Machine Co., Worcester, Mass.
Independent Pneumatic Tool Co., Chicago.
MacGovern & Co., Montreal, Que.

GRINDERS, ROTARY SURFACE
Brown & Sharpe Mfg. Co., Providence, R.I.
Bristol Machine Tool Co., Bristol, Conn.

GRINDERS, TOOL AND HOLDER
Armstrong Bros. Tool Co., Chicago.
W. F. & John Barnes Co., Rockford, Ill.
Blount, & Co., J. G., Everett, Mass.
Brown & Sharpe Mfg. Co., Providence, R.I.
Ford-Smith Machine Co., Hamilton, Ont.
Greenfield Machine Co., Greenfield, Mass.
Greenfield Tap & Die Corp., Greenfield.
National-Acme Co., Cleveland, Ohio.
Tabor Mfg. Co., Philadelphia, Pa.
Wells Bros. of Canada, Galt, Ont.

GRINDERS, UNIVERSAL, PLAIN
Modern Tool Co., Erie, Pa.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDERS, VERTICAL, SURFACE
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Montreal.
Heald Machine Co., Worcester, Mass.
Pratt & Whitney Co., Dundas, Ont.
Gisholt Machine Co., Madison, Wis.
Norton Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal.

GRINDING AND POLISHING MACHINES, PORTABLE, PNEUMATIC AND SPRING FRAME
Can. Fairbanks-Morse Co., Montreal.
Cincinnati Elec. Tool Co., Cincinnati, O.
Ford-Smith Mach. Co., Hamilton, Ont.
Gardner & Son, Robt., Montreal.
Garvin Machine Co., New York.
Garlock-Walker Machinery Co., Toronto.
Greenfield Machine Co., Greenfield, Mass.
Hall & Sons, John H., Brantford, Ont.
LeBlond Mch. Tool Co., R. K., Cincinnati.
Niles-Bement-Pond Co., New York, N.Y.
Norton Co., Worcester, Mass.
Wisconsin Electric Co., Racine, Wis.
Williams & Wilson, Ltd., Montreal.

GRINDING MACHINES, CAR WHEEL, CUTTER, CYLINDRICAL, CRANKSHAFT
Brown & Sharpe Mfg. Co., Providence, R.I.
Norton Co., Worcester, Mass.

GRINDING WHEELS
Aikenhead Hardware Co., Toronto, Ont.
Brantford Emery Wheel Co., Brantford.
Can. Fairbanks-Morse Co., Montreal.
Ford-Smith Machine Co., Hamilton, Ont.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Norton Co., Worcester, Mass.

GUARDS, WINDOW AND MACHINE
Canada Machinery Corp., Galt, Ont.
Canada Wire & Iron Goods, Co., Hamilton.
Dennis Wire & Iron Works, London, Ont.
Page Steel & Wire Co., Adrian, Mich.
Strong, Kennard & Nutt Co., Cleveland.

HANDLES, BALANCE, CRANK AND MACHINE
Williams & Co., J. H., Brooklyn, N.Y.

GUTTERS AND SKYLIGHTS
H. H. Robertson, Ltd., Sarnia, Ont.

HACK SAW BLADES
Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blancke Co., L. C., New York City.
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks-Morse Co., Montreal.
Diamond Saw & Stamping Wks., Buffalo.
Ford-Smith Machine Co., Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Fry's (London), Ltd., London, England.
Racine Tool & Machine Co., Racine, Wis.
Plewes, Ltd., Winnipeg, Man.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Simonds Mfg. Co., Fitchburg, Mass.
L. S. Starrett Co., Athol, Mass.
Standard Machy. & Supplies, Montreal.
Victor Saw Works, Ltd., Hamilton.
Wilkinson & Kompass, Hamilton.
Williams & Wilson, Ltd., Montreal.

HACK SAW FRAMES
Aikenhead Hardware Co., Toronto.
Can. Fairbanks-Morse Co., Montreal.
Ford-Smith Machine Co., Hamilton, Ont.
Garvin Machine Co., New York City.
Victor Saw Works, Hamilton, Ont.
Rice Lewis & Son, Toronto, Ont.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal.

HACK SAWS, POWER
Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Diamond Saw & Stamping Wks., Buffalo.
Foss Mchy. & S'ply. Co., G. F., Montreal.
Ford-Smith Machine Co., Hamilton.
Peerless Machine Co., Racine, Wis.
Racine Tool & Mach. Co., Racine, Wis.
Starrett Co., L. S., Athol, Mass.
Victor Saw Works, Hamilton, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal.

HAMMERS, HATCHETS
Whitman & Barnes Co., St. Catharines.

HAMMERS (DROP), MOTOR AND BELT DRIVEN
Beaudry & Co., Boston, Mass.
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton.
Can. Billings & Spencer, Ltd., Welland.
Canada Machinery Corp., Galt, Ont.
High Speed Hammer Co., Rochester, N.Y.
Jardine & Co., A. B., Hespeler, Ont.
Niles-Bement-Pond Co., New York, N.Y.
Toledo Machine & Tool Co., Toledo.
United Hammer Co., Boston, Mass.
Williams & Wilson, Ltd., Montreal.

HAMMERS, HELVE POWER
Canada Machinery Corp., Galt, Ont.
West Tire Setter Co., Rochester, N.Y.
Williams & Wilson, Limited, Montreal.

HAMMERS, CHIPPING, CAULKING, PNEUMATIC
Can. Ingersoll-Rand Co., Montreal, Que.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.

HAMMERS, MARKING
Matthews & Co., Jas. H., Pittsburgh, Pa.

HAMMERS, NAIL MACHINE
Rice Lewis & Son, Toronto, Ont.
United Hammer Co., Boston, Mass.

HAMMERS, STEAM
Canada Machinery Corp., Galt, Ont.
Niles-Bement-Pond Co., New York.

HAND PLANERS
Oliver Mchry. Co., Grand Rapids, Mich.

HAND LEATHERS OR PADS
Graton & Knight Mfg. Co., Montreal.

HANGERS
Brown & Sharpe Mfg. Co., Providence, R.I.

HANGERS, SHAFT
Algoma Steel Corp., Sault Ste. Marie.
Can. General Electric Co., Toronto, Ont.
Chapman Double Ball Bearing Co., Toronto.
Gray Ball Bearing Co., Ltd., Toronto.
Baird Machine Co., Bridgeport, Conn.
Can. S K F Co., Toronto, Ont.
Gardner & Son, Robt., Montreal.
Jones & Glassco, Montreal.
Standard Pressed Steel Co., Philadelphia.
Williams & Wilson, Limited, Montreal.

HARDNESS TESTING INSTRUMENTS
Shore Instrument & Mfg. Co., New York.

HEAD, AUXILIARY
Hoefer Mfg. Co., Freeport, Ill.

HEATING AND VENTILATING ENGINEERS
Can. Blower & Forge Co., Kitchener, Ont.

HEAT TREATMENT OF STEEL
Gray Ball Bearing Co., Ltd., Toronto.

HEAT GAUGES, HARDENING AND ANNEALING
Shore Instrument & Mfg. Co., New York.

HELMETS, SANDBLAST, AMMONIA
Strong, Kennard & Nutt Co., Cleveland.

HIGH SPEED STEEL
See Steel.

HINGE MACHINERY
Baird Machine Co., Bridgeport, Conn.
Illinois Tool Works, Chicago, Ill.

HINGES
[illegible], Rock Island, Que.
London Bolt & Hinge Wks., London, Ont.

HOBS
Greenfield Tap & Die Co., Greenfield, Mass.
Illinois Tool Works, Chicago, Ill.
Pratt & Whitney Co., Dundas, Ont.
Taylor, J. A. M., 318 Stair Bldg., Toronto.
Wells Bros. of Canada, Galt, Ont.

HOISTS, AIR
Can. Ingersoll-Rand Co., Ltd., Sherbrooke.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

HOISTS, CHAIN AND PNEUMATIC
Can. Ingersoll-Rand Co., Montreal, Que.
Garlock-Walker Machinery Co., Toronto.
Ford Chain Block & Mfg., Philadelphia.
Independent Pneumatic Tool Co., Chicago.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Wright Mfg. Co., Lisbon, Ohio.
Williams & Wilson, Limited, Montreal.

HOISTS, ELECTRICAL
Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Electric Steels & Metals Ltd., Welland.
Kennedy & Sons, Owen Sound, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal.

HOISTS, ELEC., STATIONERY, MONO RAIL
Volta Mfg. Co., Welland, Ont.

HOLDERS, STEEL DIE FOR MARKING
Matthews & Co., Jas. H., Pittsburgh, Pa.

HOLDERS, ELECTRIC
Electric Steels & Metals, Ltd., Welland.

HOOKS, BELT LACING
Clipper Belt Lacer Co., Grand Rapids.

HOPPERS
MacKinnon Steel Co., Ltd., Sherbrooke.
Dominion Bridge Co., Montreal, Que.
William Hamilton Co., Peterboro, Ont.
Toronto Iron Works, Ltd., Toronto, Ont.

HOSE, PNEUMATIC
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Wells Bros. Co. of Canada, Galt, Ont.

HOSE, ALL KINDS
Int. Mach. & Supply Co., Ltd., Montreal.

HOSE, SAND BLAST
Pangborn Corporation, Hagerstown, Md.

HYDRAULIC MACHINERY
Garlock-Walker Machinery Co., Toronto.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
West Tire Setter Co., Rochester, N.Y.

Victoria Foundry Co., Ottawa.
Williams & Wilson, Limited, Montreal.

HYDROMETERS, HYGROMETERS, HYGRODEIKS
Taylor Instrument Co., Rochester, N.Y.

INDICATORS, SPEED
Aikenhead Hardware Co., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence.
Starrett Co., L. S., Athol, Mass.

INDEX CENTRES
Brown & Sharpe Mfg. Co., Providence, R.I.
Dickow, Fred C., Chicago, Ill.
Ford-Smith Machine Co., Hamilton, Ont.
Garvin Machine Co., New York.
Williams & Wilson, Limited, Montreal.

INDICATING INSTRUMENTS
Taylor Instrument Co., Rochester, N.Y.

INGOT METAL
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

INGOTS, STEEL
Nova Scotia Stl. & Coal Co., New Glasgow.

INGOTS, FORGING AND ROLLING
Electric Steel & Metals Co., Welland.

INSULATING COMPOUNDS
H. H. Robertson Co., Ltd., Sarnia, Ont.

INSTRUMENTS, ENGINEERING
Consolidated Optical Co., Toronto.

IRON ORE
Hanna & Co., M. A., Cleveland, O.

IRON, WROUGHT, ROLLED, PIG
Swedish Steel & Impt. Co., Ltd., Montreal.

JACKS
Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Norton, A. O., Coaticook, Que.
Rice Lewis & Son, Toronto, Ont.
Williams & Wilson, Limited, Montreal.

JACKS, PIT AND TRACK
Canadian Fairbanks-Morse Co., Montreal.
Northern Crane Works, Walkerville.

JAWS, FACE PLATE
Cushman Chuck Co., Hartford, Conn.
Skinner Chuck Co., New Britain, Conn.

JOINTERS
Gray Ball Bearing Co., Ltd., Toronto.

JIGS, TOOLS, ETC.
Brown Engineering Corp., Toronto.
Elliott & Whitehall Mach. & Tool Co., Galt.
Gisholt Machine Co., Madison, Wis.
Homer & Wilson, Hamilton, Ont.
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Toronto Tool Co., Toronto, Ont.

JOURNAL WEDGES
Canada Foundries & Forgings, Welland.

KEY SEATERS
Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
Morton Mfg. Co., Muskegon Heights, M.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal.

KEYS, MACHINE
Whitney Mfg. Co., Hartford, Conn.
Williams & Co., J. H., Brooklyn, N.Y.

KILNS
Can. Blower & Forge Co., Kitchener, Ont.
Kennedy & Sons, Wm., Owen Sound, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

KNIFE GRINDERS
Gray Ball Bearing Co., Ltd., Toronto.

LABELS AND TAGS
Matthews & Co., Jas. H., Pittsburgh, Pa.

LABORATORIES, INSPECTION AND TESTING (See Chemists)

LADLES, FOUNDRY
Northern Crane Works, Walkerville.

LACING MACHINES
Clipper Belt Lacer Co., Grand Rapids, M.

LAMPS, ARC, INCANDESCENT
Can. General Electric Co., Toronto, Ont.

LAMPS, TUNGSTEN AND NITRO
Can. General Electric Co., Toronto, Ont.

LAG SCREW GIMLET POINTERS
National Machy. Co., Tiffin, Ohio.

LATH
H. H. Robertson, Ltd., Sarnia, Ont.

LATHES, CHUCKING
Acme Machine Tool Co., Cincinnati, Ohio.
Wood Turret Machine Co., Brazil, Ind.
Williams & Wilson, Limited, Montreal.

LATHE CHUCKS (See Chucks)

LATHE DOGS AND ATTACHMENTS
Armstrong Bros. Tool Co., Chicago.
Curtis & Curtis Co., Bridgeport, Conn.

If interested tear out this page and place with letters to be answered.

BUYERS' DIRECTORY

Hendey Machine Co., Torrington, Conn.
Williams & Co., J. H., Brooklyn, N.Y.

LATHES, AUTOMATIC AND SEMI-AUTOMATIC
Gisholt Machine Co., Madison, Wis.
Wood Turret Machine Co., Brazil, Ind.

LATHES, AXLE
Bridgeford Mach. Tool Works, Rochester.

LATHES, BORING
Bridgeford Mach. Tool Works, Rochester.
Lodge & Shipley, Cincinnati, O.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, PRECISION, BENCH
W. F. & John Barnes Co., Rockford.
J. G. Blount & Co., Everett, Mass.
Canadian Fairbanks-Morse Co., Montreal.
Geo. F. Foss Machy. & Supply Co., Montreal.
Garlock-Walker Machinery Co., Toronto.
Hardinge Bros., Chicago, Ill.
Pratt & Whitney Co., Dundas, Ont.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, BRASS
Acme Machine Tool Co., Cincinnati, Ohio.
Hardinge Bros., Chicago, Ill.
Wood Turret Machine Co., Brazil, Ind.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, ENGINE
Acme Machine Tool Co., Cincinnati, Ohio.
John Bertram & Sons Co., Dundas.
Bridgeford Mach. Tool Wks., Rochester.
Canada Mach'y Corp., Galt, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cisco Machine Tool Co., Cincinnati, Ohio.
Wickes Bros., Saginaw, Mich.
G. F. Foss Mchy. & S'ply Co., Montreal.
Garlock-Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Gisholt Machine Co., Madison, Wis
Kennedy & Sons, Wm., Owen Sound, Ont.
R. McNaught Co., Galt.
Miles-Bement-Pond Co., New York.
Rice Brothers, Hamilton, Ont.
Smalley-General Co., Inc., Bay City, Mich.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Sidney Tool Co., Sidney, Ohio.
Walcott Lathe Co., Jackson, Mich.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.
Worcester Lathe Co., Worcester, Mass.

LATHES, FOOT POWER
Seneca Falls Mfg. Co., Seneca Falls, N.Y.

LATHES, HORIZONTAL
Wood Turret Machine Co., Brazil, Ind.

LATHES, JOURNAL TRUEING
Bridgeford Mach. Tool Works, Rochester.

LATHES, PATTERNMAKERS'
J. G. Blount Co., Everett, Mass.
Can. Machinery Corp., Galt.
Wood Turret Machine Co., Brazil, Ind.
G. F. Foss Mchy. & S'ply Co., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, POLISHING
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, SCREW CUTTING
Bertram & Sons Co., John, Dundas, Ont.
Bridgeford Mach. Tool Works, Rochester.
Canada Machinery Corp., Galt, Ont.
Cisco Machine Tool Co., Cincinnati, O.
Foss Mchy. & S'ply Co., G. F., Montreal.
Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machy. Co., Toronto, Ont.
Hardinge Bros., Inc., Chicago, Ill.
Hepburn Ltd., John T., Toronto, Ont.
Niles-Bement-Pond Co., New York.
Rice Brothers, Hamilton, Ont.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.
Wickes Bros., Saginaw, Mich.
Williams Machy. Co., A. R., Toronto
Wood Turret Machine Co., Brazil, Ind.
Worcester Lathe Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, SPINNING
Bliss Co., E. W., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

LATHES, TOOL ROOM
Cisco Machine & Tool Co., Cincinnati, O.
Rice Brothers, Hamilton, Ont.
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
Worcester Lathe Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

LEAD BURNING
St. Lawrence Welding Co., Montreal

LEAD BURNING OUTFITS
Turner Brass Works, Sycamore, Ill.

LEATHER STRAPPING
Graton & Knight Mfg. Co., Worcester, M.

LENSES FOR GOGGLES
Standard Optical Co., Geneva, N.Y.

LIDS, SCREW TOP AND HINGE
Can. Winkley Co., Ltd., Windsor, Ont.

LINK BELTING
See Belting, Chain.

LINOLEUM MILL MACHINERY
Bertrams, Ltd., Edinburgh, Scotland.

LOCKERS, STEEL WARDROBE AND STEEL MATERIAL
Canada Wire & Iron Gds. Co., Hamilton
Dennis Wire & Iron Works, London, Ont.

LUBRICANTS
Cataract Refining & Mfg. Co., Toronto.

LUBRICATING, OIL FILTERING AND CIRCULATING SYSTEMS
Bowser Co., Ltd., S. F., Toronto, Ont.

LUBRICATORS
Trahern Pump Co., Rockford, Ill.

LUMBERMEN'S TOOLS
Thos. Pink Co., Ltd., Pembroke, Ont.

MACHINE COUNTER WEIGHTS
Katie Foundry, Galt, Ont.

MACHINE TOOLS
Rice Brothers, Hamilton, Ont.

MACHINERY, CORNER AND BENDING
Peck, Stow & Wilcox Southington, Conn.

MACHINERY DEALERS
Archibald & Co., Chas. P., Montreal.
Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MACHINERY GUARDS (See Guards)

MACHINISTS' TOOLS
Brown & Sharpe Mfg. Co., Providence, R.I.

MAGNETIC BRAKES FOR ELECTRIC MOTORS
Volta Mfg. Co., Welland, Ont.

MANDRELS
Bilton Mach. Tool Co., Inc., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Jardine & Co., A. B., Hespeler, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

MARKING DEVICES
Pritchard-Andrews Co. of Can., Ottawa.
Matthews & Co., Jas. H., Pittsburgh, Pa

MARKING MACHINERY
Brown, Boggs Co., Hamilton, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Perrin, Wm. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MASKS, WELDING, SMOKE, FUME, GAS, ETC.
Strong, Kennard & Nutt Co., Cleveland

MEASURING MACHINES
Pratt & Whitney Co., Dundas, Ont.

MEASURES, REGISTERING
Bowser Co., Ltd., S. F., Toronto, Ont.

MEASURING TAPES AND RULES
Chesterman & Co., Jas., Sheffield, Eng.

METALLURGISTS
See Chemists.

METAL SAWS
See Saws.

METAL SAWS, POWER
Hoefer Mfg. Co., Freeport, Ill.

METALS
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.
Canada Metal Co., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.

METAL, STAMPINGS, SMALL
Can. Winkley Co., Ltd., Windsor, Ont.

METERS, OIL, GASOLINE, KEROSENE, ETC.
Bowser Co., Ltd., S. F., Toronto, Ont.

MICROMETERS
Almond Mfg. Co., Ashburnham, Mass.
Taylor, J. A. M., 318 Stair Bldg., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLS, BRACE AND TUBE
Elec. Steel & Metals, Welland, Ont.

MILLS, SAND
Frost Mfg. Co., Chicago, Ill.

MILL MACHINERY
Alexander Fleck, Ltd., Ottawa.
Greenfield Tap & Die Corp., Greenfield
Wells Bros. of Canada, Galt, Ont.

MILLING ARBORS
Brown & Sharpe Mfg. Co., Providence, R.I.
Kearney & Trecker Co., Milwaukee, Wis.

MILLING ATTACHMENTS
Becker Milling Machine Co., Boston, Mass.
Bertram & Sons Co., John, Dundas, Ont.
Brown & Sharpe Mfg. Co., Providence.
Canada Machinery Corp., Galt, Ont.
Cincinnati Milling Machine Co., Cincinnati
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal
Hardinge Bros., Inc., Chicago, Ill.
Hendey Mach. Co., Torrington, Conn.
Hinckley Machine Works, Hinckley, Wis.
Kearney & Trecker Co., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Taft-Peirce Mfg. Co., Woonsocket, R.I.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, AUTOMATIC
Bilton Mach. Tool Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence, R.I.
Betts Machine Co., Rochester, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

MILLING CUTTERS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Blancke Co., L. C., New York City.
Cleveland Milling Machine Co., Cleveland.
Kearney & Trecker Co., Milwaukee, Wis.
Marshall, Son & Bunney, Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, HAND
Bristol Machine Tool Co., Bristol, Conn.

MILLING MACHINES, THREAD
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.
Gray Ball Bearing Co., Ltd., Toronto.
United States Mach. Tool Co., Cincinnati.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, HORIZONTAL AND VERTICAL
Becker Milling Machine Co., Boston, Mass
Bristol Machine Tool Co., Bristol, Conn.
Brown & Sharpe Mfg. Co., Providence.
Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Ford-Smith Mach. Co., Hamilton, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
Gooley & Edlund, Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Kearney & Trecker Co., Milwaukee, Wis.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati.
Whitney Mfg. Co., Hartford, Conn.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, PLAIN, BENCH AND UNIVERSAL
Becker Milling Machine Co, Boston, Mass.
Bilton Mach. Tool Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence.
Canada Machinery Corp., Galt, Ont.
Cincinnati Milling Machine Co., Cincinnati
Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
National Machy. Co., Tiffin, Ohio.
Gooley & Edlund, Inc., Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Hendey Machine Co., Torrington, Conn.
Kearney & Trecker Co., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING MACHINES, PROFILE
Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que.

MILLING TOOLS
Aikenhead Hardware Co., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence.
Ford-Smith Mach. Co., Hamilton, Ont.
Geometric Tool Co., New Haven, Conn.
Kempsmith Mfg. Co., Milwaukee, Wis.
Rice Lewis & Son, Toronto, Ont.
Tabor Mfg. Co., Philadelphia, Pa.
Williams & Wilson, Ltd., Montreal, Que.

MINE CARS
Can. Fairbanks-Morse Co., Montreal
Dominion Bridge Co., Montreal, Que.
Elec. Steel & Metals, Welland, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.

MINING MACHINERY
Can. Fairbanks-Morse Co., Montreal.
Elec. Steel & Metals, Welland, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MIXERS, SAND
Frost Mfg. Co., Chicago, Ill.

MORTISING MACHINES
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
Gray Ball Bearing Co., Ltd., Toronto.

MOTORS, ELECTRIC
Can. Fairbanks-Morse Co., Montreal.
Can. General Electric Co., Toronto.
Garlock-Walker Machy. Co., Toronto, Ont.
Lancashire Dynamo & Motor Co., Ltd., Toronto.
MacGovern & Co., Montreal, Que.
Volta Mfg. Co., Welland, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MOTOR SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

MOTORCYCLE FRAME AND FORK
The Dunbar Brothers Co., Bristol, Conn.

MOTORS, PNEUMATIC
Cleveland Pneumatic Tool Co., Toronto.

MULTIPLE INDEX CENTRES
Garvin Machine Co., New York.

MULTI-DRILLING, MULTI-BORING, MULTI-TAPPING MACHINERY.
Nat. Automatic Tool Co., Richmond, Ind.

MUNTZ METAL
Brown's Copper & Brass Roller Mills, New Toronto, Ont.

MUSIC WIRE
Blancke Co., L. C., New York City.

NAIL SETS
Morrow Screw & Nut Co., J., Ingersoll, Ont

NAME PLATES, BRONZE, ETCHED AND STAMPED
Matthews & Co., Jas. H., Pittsburgh, Pa.
Pritchard-Andrews Co., Ottawa, Ont.
Turner Brass Works, Sycamore, Ill.

NICHROME CASTINGS
Can. Driver-Harris Co., Ltd., Walkerville.

NICKEL
Baker & Co., Inc., H., Montreal, Que.
Pilot Steel & Tool Co., Montreal, Que.

NICKEL SILVER
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

NICKEL STEEL
See Steel.

NIPPLE HOLDERS
Curtis & Curtis Co., Bridgeport, Conn.

NIPPLE THREADING MACHINES
Hall & Sons, Ltd., John H., Brantford.
Landis Machine Co., Waynesboro, Pa.

NITROGEN
Carter Welding Co., Toronto, Ont.

NUTS, STEEL, CASTELLATED AND COLD PRESSED
Galt Machine Screw Co., Ltd., Galt, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Williams & Co., J. H., Brooklyn, N.Y.

NUTS, SEMI-FINISH AND FINISHED
Galt Machine Screw Co., Galt, Ont.
National-Acme Co., Cleveland, Ohio.
Wilkinson & Kompass, Hamilton.

NUT BURRING AND NUT MACHINES (HOT)
National Machy. Co., Tiffin, Ohio.

NUT FACING AND BOLT SHAVING MACHINES
Garvin Machine Co., New York.
National Machinery Co., Tiffin, Ohio.
Victor Tool Co., Waynesboro, Pa.
Williams & Wilson, Ltd., Montreal, Que.

NUT TAPPERS
Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
Hall & Son, J. H., Brantford, Ont.
Jardine & Co., A. B., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

OIL SEPARATORS
Can. Fairbanks-Morse Co., Montreal.

OIL STONES
Aikenhead Hardware Co., Toronto, Ont.
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

OIL STONE GRINDERS
Oliver Machy. Co., Grand Rapids, Mich

OIL STORAGE SYSTEMS
Bowser Co., Ltd., S. F., Toronto, Ont.

OPENING DIE HEADS
Greenfield Tap & Die Corp, Greenfield.
Wells Bros. of Canada, Galt, Ont.

OPTICAL SUPPLIES
Consolidated Optical Co., Toronto, Ont.

OSCILLATING VALVE GRINDERS (PNEUMATIC)
Cleveland Pneumatic Tool Co. of Canada, Toronto.

OVENS FOR BAKING, BLUING, DRYING, ENAMELING, JAPANNING AND LACQUERING
Brantford Oven & Rack Co., Brantford.

OVEN TRUCKS, STEEL
Brantford Oven & Rack Co., Brantford.
MacKinnon Steel Co., Sherbooke, Que.

OVENS FOR DRYING, TEMPER AND OXYGEN, ELECTROLYTIC CELLS UNDER TRUCKS
Welding & Supplies Co., Montreal, Que.
Brantford Oven & Rack Co., Brantford.

OXY-ACETYLENE WELDING AND CUTTING AND OUTFITS
Carter Welding Co., Toronto, Ont.
Prest-o-Lite Co., Inc. Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.
Welding & Supplies Co., Montreal, Que.

PACKINGS, ASBESTOS
Cleveland Wire Spring Co., Cleveland.

PACKINGS, LEATHER, HYDRAULICS, ETC.
Graton & Knight Mfg. Co., Worcester, M.

Perrin, Ltd., William, Toronto.

PANS, WET AND DRY
Frost Mfg. Co., Chicago, Ill.

PAPER MILL CONVEYORS AND DRIVES
Bertrams, Ltd., Edinburgh, Scotland.
Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

PARTITIONS, WIRE
See Guards

PAPER MILL MACHINERY
Garlock-Walker Machinery Co., Toronto.
MacKinnon Steel Co., Sherbrooke, Que.

PATTERN SHOP EQUIPMENT
Canada Machinery Corp., Galt, Ont.
Oliver Machy. Co., Grand Rapids, Mich.
Garlock-Walker Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PATTERN MAKERS' LATHES
See Lathes.

PATENT SOLICITORS
Budden, Hanbury A., Montreal.
Fetherstonhaugh & Co., Ottawa.
Marion & Marion, Montreal.
Ridout & Maybee, Toronto.
Shipman & Co., H. C., Ottawa.
Wilson & Co., J. C., Belleville, Ont.
Greenleafs, Ltd., Belleville, Ont.
Marten Machine Co., Hamilton, Ont.

PECK CARRIERS FOR POWER PLANTS
Can. Link-Belt Co., Toronto, Ont.

PENSTOCKS
William Hamilton Co., Peterboro, Ont.

PERFORATED METALS AND ORNAMENTAL IRON GOODS
Canada Wire & Iron Goods Co., Hamilton

PIG IRON
Hanna & Co., M. A., Cleveland, O.
Steel Co. of Canada, Ltd., Hamilton, Ont.

PINS, TAPER
Morrow Screw & Nut Co., J., Ingersoll, Ont

PINS, BELT-LACING
Clipper Belt Lacer Co., Grand Rapids.

PIPE FITTINGS, MALLEABLE AND CAST IRON
International Malleable Iron Co., Guelph

PIPE CUTTING AND THREADING MACHINES
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Garlock-Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield.
Hall & Sons, John H., Brantford.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
McDougall Co., R., Galt.
Wells Bros. Co. of Canada, Galt, Ont.
Williams Tool Co., Erie, Pa.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PHOTOSTATS
Commercial Camera Co., Providence, R.I

PIPE RIVETED STEEL
Toronto Iron Works, Ltd., Toronto.
William Hamilton Co., Peterboro, Ont.

PIERCING
Oliver Machy. Co., Grand Rapids, Mich.

PIPE CUTTERS, ROLLING
Curtis & Curtis Co., Bridgeport, Conn.
Greenfield Tap & Die Corp., Greenfield.
Hall & Sons, Ltd., John H., Brantford.
Wells Bros. Co. of Canada, Galt, Ont.

PIPE TOOLS AND DIES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros of Canada, Galt, Ont.

PIPE CUTTERS AND REAMERS
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.

PIPE STOCKS AND THREADERS
Greenfield Tap & Die Corp., Greenfield.
Wells Bros of Canada Galt, Ont

PIPE TAPS AND VISES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros of Canada Galt, Ont.

PIPE WRENCHES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros of Canada, Galt, Ont.

PISTON AND PISTON RING MACHINES
National Acme Co., Windsor, Vt.

PLANER BOLTS
Morrow Screw & Nut Co., J., Ingersoll, Ont

PLANER JACKS
Armstrong Bros. Tool Co., Chicago.

PLANERS, STANDARD AND ROTARY
Betts Machine Co., Rochester, N.Y.
Bertram & Sons Co., John, Dundas
Oliver Machy. Co., Grand Rapids, Mich.
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal
Foss Machy. & Sply. Co., G. F., Montreal
Gardner & Son, Robt., Montreal
Garlock Walker Machinery Co., Toronto
Garvin Machine Co., New York
Morton Mfg. Co., Muskegon Heights, Mich
Niles-Bement-Pond Co., New York.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.
Williams & Wilson, Ltd., Montreal, Que.

PLANING AND SHAPING MACHINERY
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Machy. & S'ply Co., G. F., Montreal.
Garlock-Walker Machinery Co., Toronto.
Garvin Machine Co., New York.
Niles-Bement-Pond Co., New York.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PLANER-SHAPER, COMBINED OPEN SIDE
Lynd-Farquhar Co., Boston.
Williams & Wilson, Ltd., Montreal, Que.

POWER HAMMERS
Quickwork Co., St. Marys, Ohio.

PLANING MILL EXHAUSTERS
Can. Blower & Forge Co., Kitchener, Ont.
MacGovern & Co., Montreal, Que.
Niles-Bement-Pond Co., New York.

PLIERS
Aikenhead Hardware Co., Toronto.
Can. Billings & Spencer, Ltd., Welland.
Peck, Stow & Wilcox Co., Southington, Ct.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Co., St. Catharines.

PNEUMATIC TOOLS
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland P'matic Tool Co., Can., Toronto.
Curtis Pneumatic Machy. Co., St. Louis.
Garlock-Walker Machy Co., Toronto.
Int. Mach. & Supply Co., Ltd., Montreal.
Independent Pneumatic Tool Co., Chicago.

POWER CRANES, HAND
MacKinnon Steel Co., Sherbrooke, Que.

POLISHING MACHINES
Brown & Sharpe Mfg. Co., Providence, R.I.
Ford-Smith Machine Co., Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

POTS AND KETTLES, CAST STEEL
Elec. Steel & Metals, Welland, Ont.

POLISHING PLATES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que

POWER HOUSE CONVEYORS
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

POWER TRANSMISSION MCHY.
Williams & Wilson, Ltd., Montreal, Que.

PRESSED STEEL PARTS
Gray Ball Bearing Co., Ltd., Toronto.

PRESSERS, ARBOR
Atlas Press Co., Kalamazoo, Mich.
Metalwood Mfg. Co., Detroit, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, BROACHING, FORGING AND FLANGING
Atlass Press Co., Kalamazoo, Mich.
Bliss Co., E. W., Brooklyn, N.Y.
Metalwood Mfg. Co., Detroit, Mich
Toledo Machine & Tool Co., Toledo.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, CAM, TOGGLE, EYELET
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N.Y.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, FILTER
Perrin, Ltd., William R., Toronto.
Smalley-General Co., Inc., Bay City, Mich.

PRESSES, PNEUMATIC
Metalwood Mfg. Co., Detroit, Mich.
Toledo Machine & Tool Co., Toledo.

PRESSES, DROP AND FORGING
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co, Ltd., Hamilton.
Can. Fairbanks-Morse Co., Montreal.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, HYDRAULIC
Bertram & Sons Co., John, Dundas.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
Perrin, Ltd., William R., Toronto.
Toledo Machine & Tool Co., Toledo.
Stoll Co., Inc., D. H., Buffalo, N.Y.
West Tire Setter Co., Rochester, N.Y.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, BALING
Perrin, Ltd., William R., Toronto.

PRESSES, POWER
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Consolidated Press Co., Hastings, Mich.
Garlock-Walker Machinery Co., Toronto.
Perrin, Ltd., William R., Toronto.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SPRING FOOT
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Ont.
Consolidated Press Co., Hastings, Mich.
Toledo Machine & Tool Co., Toledo.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, SCREW
Barnes & Co., W. F. & Jno., Rockford, Ill
Bliss Co., E. W., Brooklyn, N.Y.
Perrin, Ltd., William R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PRESSES, TRIMMING
Bliss Co., E. W., Brooklyn, N.Y.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Stoll Co., D. H., Buffalo, N.Y.
Williams & Wilson Ltd., Montreal, Que.

PROPELLERS
Kennedy & Sons, Wm., Owen Sound.

PROTECTIVE COATINGS
H. H. Robertson, Ltd., Sarnia, Ont.

PSYCROMETERS, SLING
Taylor Instrument Co., Rochester, N.Y.

PULLEYS
Algoma Steel Corp., Sault Ste. Marie, Ont
American Pulley Co., Philadelphia.
Baird Machine Co., Bridgeport, Conn.
Bernard Industrial Co., Fortierville, Que.
Brown & Sharpe Mfg Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Ford-Smith Machine Co., Hamilton, Ont.
Kennedy & Sons, Ltd., W., Owen Sound.
Positive Clutch & Pulley Works Ltd., Toronto.
Wilson & Co., J. C., Belleville, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PULLEYS, STEEL SASH, STEEL BELT
American Pulley Co., Philadelphia, Pa.

PULLEYS, FRICTION, CLUTCH
American Pulley Co., Philadelphia, Pa.
Baird Machine Co., Bridgeport, Conn
Bernard Industrial Co., A., Fortierville, Q.
Can. Link-Belt Co., Toronto, Ont.
Carlyle Johnson Mch. Co., Manchester, Ct.
Positive Clutch & Pulley Works, Toronto.
Jones & Glassco, Montreal.
Williams & Wilson, Ltd., Montreal, Que

PULP MILL MACHINERY
MacKinnon Steel Co., Sherbrooke, Que.

PUMPS, CENTRIFUGAL
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Ingersoll-Rand Co., Montreal, Que.
Darling Bros., Ltd., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Williams & Wilson, Ltd., Montreal, Que

PUMPS, FUEL OIL
Brown & Sharpe Mfg. Co., Providence, R.I.
Darling Bros., Ltd., Montreal, Que.
Trahern Pump Co., Rockford, Ill.

PUMPS, GEARED
Darling Bros., Ltd., Montreal, Que.

PUMPS, HIGH PRESSURE
Perrin, Ltd., William R., Toronto.

PUMPS, HYDRAULIC
Garlock-Walker Machinery Co., Toronto.
Darling Bros., Ltd., Montreal, Que.
Elec. Steel & Metals, Welland, Ont.
Metalwood Mfg. Co., Detroit, Mich.
Perrin, Ltd., William R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

PUMPS, LUBRICATING, OIL STORAGE

PUMPS, SPECIAL
Elec. Steel & Metals, Welland, Ont.

PUMPS, RUBBER CEMENT

PUMPS, KEROSENE, OIL, SELF-MEASURING

PUMPS, LUBRICANT, OIL, WATER
Darling Bros., Ltd., Montreal, Que.
Fry's (London), Ltd., London, England.
Trahern Pump Co., Rockford, Ill.

PUMPS, SUD
Fry's (London), Ltd., London, England.

PUMP LEATHERS
Graton & Knight Mfg. Co., Worcester.

PUNCHES AND DIES
Atkins & Co., Ltd., Wm., Sheffield, Eng.
E. W. Bliss Co, Brooklyn, N.Y.
Boker & Co., Inc., H., Montreal, Que
Brown, Boggs Co., Ltd., Hamilton, Can.
Can. Blower & Forge Co., Kitchener, Ont.
Can. Fairbanks-Morse Co., Montreal
Gardner & Son, Robert, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Marshall, Son & Blunney, Toronto.
Marten Machine Co., Hamilton, Ont.
Peck, Stow & Wilcox Co., Southington Ct.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo, O.
Whitman & Barnes Co., St. Catharines.
Williams & Wilson, Ltd., Montreal, Que.

PUNCHES, HAND
Peck, Stow & Wilcox Co., Southington, Ct.

PUNCHES, POWER
John Bertram & Sons Co., Dundas, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd, Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Garlock-Walker Machinery Co., Toronto.
A. B. Jardine & Co., Hespeler, Ont.
Long & Allstatter, Hamilton, Ohio.
Niles-Bement-Pond Co., New York.
D. H. Stoll Co., Buffalo, N.Y.
Wickes Bros., Saginaw, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PUNCHING MACHINES, HORIZONTAL
Bertrams, Ltd., Edinburgh, Scotland.
Bertrams & Sons, John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co, Ltd., Hamilton, Ont.
Garlock-Walker Mach'y. Co., Toronto.
Niles-Bement-Pond Co., New York.
Wickes Bros., Saginaw, Mich.
Williams & Wilson, Ltd., Montreal, Que.

PYROMETERS
Bristol Co., Waterbury, Conn.
Shore Instrument & Mfg. Co., New York.
Taylor Instrument Co., Rochester, N.Y.

QUARTERING MACHINES
Bertram & Sons, John, Dundas, Ont.
Niles-Bement-Pond Co., New York.

RAIL BENDERS
Algoma Steel Corp., Sault Ste. Marie, O.
Niles-Bement-Pond Co., New York.

RAILROAD TOOLS
Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machinery Co., Toronto.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Ltd., Montreal, Que.

RASPS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney, Toronto.
John Morrow Screw & Nut Co., Ingersoll.

RATCHETS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Keystone Mfg. Co., Buffalo, N.Y.
Marshall, Son & Bunney, Toronto.

RAWHIDE PINIONS (See Gears)

REAMERS
Blancke Co., L. C., New York City.
Butterfield & Co., Inc., Rock Island, Que.

REAMERS, ADJUSTABLE
Blancke Co., L. C., New York City.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Greenfield Tap & Die Corp., Greenfield.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
The Kelly Reamer Co., Cleveland, O.
J. A. M. Taylor, 318 Stair Bldg., Toronto.
Wells Bros. of Can., Galt, Ont
Whitman & Barnes Co., St. Catharines.

REAMERS, BRIDGE, EXPANDING AND HIGH SPEED
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto.
Blancke Co., L. C., New York City.
H. Boker & Co., Inc., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Gisholt Machine Co., Madison, Wis.
Illinois Tool Works, Chicago, Ill
Marshall Son & Bunney, Toronto.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pilot Steel & Tool Co., Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS STEEL TAPER AND SELF-FEEDING
Butterfield & Co., Rock Island, Que.
Blancke Co., L. C., New York City.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Illinois Tool Works, Chicago, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS, CHUCKING
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Blancke Co., L. C., New York City.
Greenfield Tap & Die Corp., Greenfield.
Marshall, Son & Bunney, Toronto.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMERS, HAND
Blancke Co., L. C., New York City.
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wells Bros. of Can., Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

If interested tear out this page and place with letters to be answered.

REAMERS, PIN
Blanchc Co., L. C., New York City.
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
Morrow Screw & Nut Co., John, Ingersoll
Wells Bros. of Can., Galt, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

REAMER FLUTING MACHINES
Garvin Machine Co., New York.

REAMING MACHINES, PNEUMATIC
Cleveland Pneumatic Co. of Can., Toronto
Garlock-Walker Machinery Co., Toronto.

RECORDING INTRUMENTS
Bristol Co., Waterbury, Conn.
Gisholt Machine Co., Madison, Wis.
Taylor Instrument Co., Rochester, N.Y.

REELS, WIRE AND TEXTILE MFG.
American Pulley Co., Philadelphia, Pa.

REGULATORS, AUTOMATIC
Electric Steels & Metals, Ltd., Welland.

REGULATORS, PRESSURE, TEMPERATURE
Can. Fairbanks-Morse Co., Montreal.
Taylor Instrument Co., Rochester, N.Y.

REPAIR WORK, ALL KINDS
Elec. Steel & Metals, Welland, Ont.

RESPIRATORS
Strong, Kennard & Nutt Co., Cleveland

RIVETS.
Aikenhead Hardware Co., Toronto, Ont.
Parmenter & Bulloch Co., Gananoque.
Rice, Lewis & Son, Toronto.
Steel Co. of Canada, Ltd., Hamilton.

RIVETERS, PNEUMATIC, HYDRAULIC, HAMMER, COMPRESSION
Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Montreal.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.

RIVETING MACHINES, ELASTIC, ROTARY BLOW
Grant Mfg. & Machine Co., Bridgeport.
High-Speed Hammer Co., Rochester.
Williams & Wilson, Ltd., Montreal.
F. B. Shuster Co., New Haven, Conn.

ROAD BUILDING EQUIPMENT
Can. Ingersoll-Rand Co., Ltd., Sherbrooke.

RODS, HIGH SPEED AND CARBON DRILL
Blanchc Co., L. C., New York City.

RODS, ROPE AND SPRING
Page Steel & Wire Co., Adrian, Mich.

RODS, PURE NICKEL, MONEL METAL, NICHROME
Can. Driver-Harris Co., Ltd., Walkerville.

ROLLER CHAINS
Can. Link-Belt Co., Toronto.
Jones & Glassco, Montreal.

ROLLS, BENDING, STRAIGHTENING
John Bertram & Sons Co., Dundas.
Brown, Boggs Co., Ltd., Hamilton.
Can. Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.
Williams & Wilson, Ltd., Montreal, Que.

ROLLS AND TABLES
Elec. Steel & Metals, Welland, Ont.

ROOFING
H. H. Robertson, Ltd., Sarnia, Ont.

ROPE, GALX, MONEL METAL, BRONZE, TILLER AND SASH CORD
Can. Driver-Harris Co., Ltd., Walkerville

ROTARY SHEARS
The Quickwork Co., St. Mary's, Ohio.

ROOF COOLERS
Electric Steels & Metals, Ltd., Welland.

ROLLS, CRUSHING
Can. Link-Belt Co., Toronto.

RUBBER MILL DRIVES
Can. Link-Belt Co., Toronto.

RUBBER MILL MACHINERY
Bertrams Ltd., Edinburgh, Scotland.

RULES
Brown & Sharpe Mfg. Co., Providence.
James Chesterman & Co., Ltd., Sheffield.
Rice, Lewis & Son, Toronto.
L. S. Starrett Co., Athol, Mass.

RULES, STEEL, STRAIGHT, AND FOLDING
Lufkin Rule Co. of Can., Windsor.

RULES, BOXWOOD, FOLDING
Lufkin Rule Co. of Can., Windsor.

RULES, BOARD AND LONG
Lufkin Rule Co. of Can., Windsor.

SAW MILL CONVEYORS
Can. Link-Belt Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

SAFETY DEVICES
Strong, Kennard & Nutt Co., Cleveland.

SAND MILLS
Frost Mfg. Co., Chicago, Ill.

SAND-BLAST EQUIPMENT SAND BLAST SUPPLIES AND ACCESSORIES
Pangborn Corporation, Hagerstown, Md.

SAFETY APPLIANCES
Strong, Kennard & Nutt Co., Cleveland.

SAFETY APPLIANCE GOGGLES
T. A. Willson Co., Inc., Reading, Pa.

SAND BLAST ABRASIVES
Pangborn Corporation, Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh

SAND MIXING MACHINERY
Frost Mfg. Co., Chicago, Ill.

SANITARY DRINKING FOUNTAINS
Puro Sanitary Drinking Fountain Co., Hawleyville.

SANDERS, DISC AND SPINDLE
Can. Sander Mfg. Co., Brockville, Ont.

SANDING MACHINES
Canada Machinery Corp., Galt
Can. Sander Mfg. Co., Brockville, Ont.

SAW MILL MACHINERY
Can. Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt.
Robert Gardner & Son, Montreal.
Curtis Pneumatic Machy. Co., St. Louis.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

SASH SPRINGS
The Dunbar Brothers Co., Bristol, Conn

SAWS, CIRCULAR METAL
Wm. Atkins & Co., Ltd., Sheffield, Eng.
Hunter Saw & Machine Co., Pittsburgh.
Marshal, Son & Bunney, Toronto.
Plewes Ltd., Winnipeg, Man.
Simonds Mfg. Co., Fitchburgh, Mass.
Tabor Mfg. Co., Philadelphia, Pa.

SAWS, HACK (See Hack Saws)

SAW SHARPENERS
Greenfield Tap & Die Corp., Greenfield.
Hunter Saw & Machine Co., Pittsburgh.
Wells Bros. of Can., Galt, Ont.

SAWS, SLITTING
J. A. M. Taylor, Stair Bldg., Toronto.

SCALES, MECHANICS'
Lufkin Rule Co. of Can., Windsor.

SCLEROSCOPES
Shore Instrument & Mfg. Co., New York.

SCREENING MACHINERY
Can. Link-Belt Co., Toronto.

SCREW DRIVERS
Wiliman & Barnes Co., St. Catharines.

SCREW EXTRACTORS
Cleveland Twist Drill Co., Cleveland.

SCREW MACHINES, HAND, AUTOMATIC
Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machy. Co., Ltd., Toronto
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield.
A. B. Jardine & Co., Hespeler.
National Acme Co, Cleveland, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Can., Galt, Ont.
Warner & Swasey Co., Cleveland, O.
A. R. Williams Machy. Co., Toronto.
Wood Turret Mach. Co., Brazil, Ind.
Williams & Wilson, Ltd., Montreal, Que.

SCREWS, MACHINE, SET, CAP AND SPECIAL
Galt Machine Screw Co., Galt.
John Morrow Screw & Nut Co., Ingersoll.
National Acme Co., Montreal.
Rice Lewis & Son, Toronto.
Steel Co. of Canada, Ltd., Hamilton.
Wilkinson & Kompass, Hamilton.

SCREW COLLARS
Galt Machine Screw Co., Ltd., Galt, Ont.
John Morrow Screw & Nut Co., Ingersoll.

SCREW MACHINES, PLAIN WIRE FEED
Brown & Sharpe Mfg. Co., Providence, R.I.

SCREW PLATES
Butterfield & Co., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield.
A. B. Jardine & Co., Hespeler.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto.
J. A. M. Taylor, Stair Bldg., Toronto.
Wells Bros. of Can., Galt.
Wilkinson & Kompass, Hamilton.

SCREWS, SAFETY SET
Galt Machine Screw Co., Ltd., Galt, Ont.

SCREW SLOTTERS
Butterfield & Co., Inc., Rock Island, Que.
Garvin Machine Co., New York.
National Acme Co., Cleveland, O.
Pratt & Whitney Co., Dundas, Ont.

SEPARATORS, MOISTENERS AND OIL FOR COMPRESSED AIR
Pangborn Corporation, Hagerstown, Md.

SELF-OPENING DIES
See Dies.

SEPARATORS, SAND
Pangborn Corporation, Hagerstown, Md.

SET SCREWS, SAFETY
Aikenhead Hardware Co., Toronto.
Bristol Co., Waterbury, Conn.
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Wilkinson & Kompass, Hamilton

SHANKS, STRAIGHT AND TAPER
Jacobs Mfg. Co., Hartford, Conn.

SHAPERS
John Bertram & Sons Co., Dundas.
Can. Fairbanks-Morse Co., Montreal
Canadian Machinery Corp., Galt.
Geo. F. Foss Mchy. & Sply. Co., Montreal
Robt. Gardner & Son, Montreal.
Garlock-Walker Machy. Co., Toronto.
Hendey Machine Co., Torrington, Conn.
Hamilton Mach. Tool Co., Hamilton.
Milwaukee Shaper Co., Milwaukee, Wis.
Rice Lewis & Son, Toronto.
Williams & Wilson, Ltd., Montreal.

SHAPERS, GEAR
Fellows Gear & Shaper Co., Springfield, V.

SHAFTING
Algoma Steel Corp., Sault Ste. Marie, O.
Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machy. Co., Ltd., Toronto
Jones & Glassco, Montreal.
Niles-Bement-Pond Co., New York.
Can. Drawn Steel Co., Hamilton.
Pratt & Whitney Co., Dundas.
Rice, Lewis & Son, Toronto.
A. R. Williams Machy Co., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Wilson & Co., J. C., Belleville, Ont.
Williams & Wilson, Ltd., Montreal, Que.

SHARPENING STONES
Norton Co, Worcester, Mass.
Rice, Lewis & Son, Toronto.

SHEARING MACHINES, ANGLE IRON, BAR AND GATE
John Bertram & Sons Co., Dundas.
Bertrams Ltd., Edinburgh, Scotland.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Ltd., Toronto
A. B. Jardine & Co., Hespeler, Ont.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.

SHEARS, POWER
John Bertram & Sons Co., Dundas.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co, Ltd., Hamilton.
Can Blower & Forge Co, Kitchener.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Ltd., Toronto
Long & Allstatler, Hamilton, Ohio.
Wickes Bros., Saginaw, Mich.
A. B. Jardine & Co., Hespeler, Ont.
National Machy. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
H. D. Stoll Co., Inc., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo, O.
Williams & Wilson Ltd., Montreal, Que.

SHEARS, ROTARY
The Quickwork Co., St Mary's, Ohio.

SHEARS, PNEUMATIC
Toledo Machine & Tool Co., Toledo, Ohio.

SHEET METAL ROLLING MACHINES
Peck, Stow & Wilcox Co., Southington.

SHEETS, NICKEL, RESIST. ALLOY
Can. Driver-Harris Co., Ltd., Walkerville.

SHEARS, PLATE CUTTING, SLITTING
Quickwork Co., St. Mary's, Ohio.

SHEARS, SPLITTING
Peck, Stow & Wilcox Co., Southington.

SHEARS, IRREGULAR AND CIRCLE CUTTING
The Quickwork Co., St. Mary's, Ohio.
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHEET METAL MACHINERY
Peck, Stow & Wilcox Co., Southington, C.

SHEARS, SERPENTINE
The Quickwork Co., St. Mary's, Ohio.

SHEARS, SQUARING
Brown, Boggs & Co., Hamilton, Ont.
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHEET METAL WORKING TOOLS
Baird Machine Co., Bridgeport, Conn.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton.
Peck, Stow & Wilcox Co., Southington C.
D. H. Stoll Co., Inc., Buffalo, N.Y.
Williams & Wilson, Ltd., Montreal.

SHEETS, CRUCIBLE, CAST
Kayser-Ellison & Co., Ltd., Montreal.
Ralph B. Norton, Agent, Montreal.

SHEET METAL WORKING MACHINERY
D. H. Stoll Co., Inc., Buffalo, N.Y.

SHELVING, STEEL
Dennis Wire & Iron Works, London.

SHIPYARD MACHINERY, SHOP FURNITURE
Dennis Wire & Iron Works, London.

SIDE TOOLS
Armstrong Bros. Tool Co., Chicago.
J. H. Williams & Co., Brooklyn, N.Y.

SILENT CHAINS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

SLEDGES
Aikenhead Hardware Co., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Wilkinson & Kompass, Hamilton, Ont.

SLEDGES, CAST IRON
Katie Foundry, Galt, Ont.

SLINGS, CHAINS
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

SLOTTERS
Betts Machine Co., Rochester, N.Y.
Garvin Machine Co., New York.
National-Acme Co., Cleveland, Ohio.
Niles-Bement Pond Co., New York.

SMOKESTACKS
William Hamilton Co., Peterboro, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

SNIPS, TINNERS AND SHEET METAL WORKERS
Kearney & Trecker Co., Milwaukee, Wis.
J. Morrow Screw & Nut Co., Ingersoll, Ont.

SOCKETS
Brown & Sharpe Mfg. Co., Providence.
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Keystone Mfg. Co., Buffalo, N.Y.
Modern Tool Co., Erie, Pa.
J. Morrow Screw & Nut Co., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.

SOIL PIPE FITTINGS, CAST IRON
Katie Foundry, Galt, Ont.

SOLDERING IRONS
Aikenhead Hardware Co., Toronto, Ont.
Brown, Boggs & Co., Hamilton, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.

SOLDER
Aikenhead Hardware Co., Toronto, Ont.
Canada Metal Co., Ltd., Toronto, Ont.
Rice Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.

SPEED REDUCING GEARS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.

SLICING CLAMPS
Peck, Stow & Wilcox Co., Southington, Conn.

SPRINGS, MACHINERY
Barnes, Wallace Co., Bristol, Conn.
Can. Steel Foundries, Ltd., Montreal
Cleveland Wire Spring Co., Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Garlock-Walker Machinery Co., Toronto.
Jas. Steele, Ltd., Guelph, Ont.

SPECIAL MACHINERY
Baird Machine Co., Bridgeport, Conn.
Bertram John. & Sons Co., Dundas.
Bliss, E. W. Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada.
Brown Engineering Corp., Toronto, Ont.
Ford-Smith Machine Co., Hamilton, Ont.
Garlock Walker Machinery Co., Toronto.
Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
Garvin Machine Co., New York.
Gooley & Eglund, Inc., Courtland, N.Y.
John H. Hall & Sons, Brantford.
A. B. Jardine & Co., Hespeler, Ont.
Katie Foundry, Galt, Ont.
National-Acme Co., Cleveland, Ohio
Marten Machine Co., Hamilton, Ont.
Rae Brothers, Hamilton, Ont.
Stoll Co., D. H., Buffalo, N.Y.
Victoria Foundry Co., Ottawa, Ont.
Wilson & Co., J. C., Belleville, Ont.
William R. Perrin, Ltd., Toronto.

SPRING COILING AND WINDING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Garvin Machine Co., New York.

SPRING MAKING MACHINERY (AUTOMATIC)
Baird Machine Co., Bridgeport, Conn.

SPRINGS, SPIRAL, TOOL
The Dunbar Bros. Co., Bristol, Conn

SPROCKETS, COMPENSATING
Morse Chain Co., Ithaca, New York

SPROCKETS, SPRING
Morse Chain Co., Ithaca, New York.

SPROCKETS, CHAIN
Can. Link-Belt Co., Toronto, Ont.
Grant Gear Works, Boston, Mass.
Jones & Glassco, Montreal.
Morse Chain Co., Ithaca, N.Y.
Philadelphia Gear Works, Philadelphia.
Wilson & Co., J. C., Belleville, Ont.

SPRINGS FOR TOYS AND ELECTRIC DEVICES
The Dunbar Bros. Co., Bristol, Conn.

SPROCKET WHEELS, CAST
Can. Link-Belt Co., Toronto, Ont.

Perrin, Wm. R., Toronto
Wilson & Co., J. C., Belleville, Ont.

SPROCKET WHEELS, CHILLED THREAD
Katie Foundry, Galt, Ont.

SQUARES
Peck, Stow & Wilcox Co., Southington, Conn.

SAFETY CYLINDERS
Oliver Mach. Co., Grand Rapids, Mich.

SANDERS
Oliver Mach. Co., Grand Rapids, Mich.

SAW BENCHES
Oliver Mach. Co., Grand Rapids, Mich.

SAW GUARDS
Oliver Mach. Co., Grand Rapids, Mich.

SAWS SWING
Oliver Mach. Co., Grand Rapids, Mich

STAYBOLT TOPS
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

STAIRS, IRON
Canada Wire & Iron Goods Co., Hamilton, Ont.

STAMPINGS, SHEET BRASS, COPPER, ALUMINUM AND STEEL
Dom. Forge & Stamping Co., Walkerville
Homer & Wilson, Hamilton, Ont.

STAMPING MACHINERY
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs, & Co., Hamilton, Can.
Canada Machinery Corp., Galt, Ont.

STAMPS, STEEL ALPHABET, FIGURES
Matthews, Jas. H & Co., Hartford, Conn.
Pritchard-Andrews Co., Ottawa, Can.

SAFETY CYLINDERS
Oliver Mach. Co., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Ltd., Montreal, Quebec.

STEAM SEPARATORS AND TRAPS
Can Fairbanks Morse Co., Montreal.

STEEL BALLS
See Balls Steel.

STEEL, CRUCIBLE TOOL
Atkins & Co., Ltd., Wm. Sheffield, Eng.
Illingworth Steel Co., John, New York.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.

STEEL, CARBON, FERRO-TUNGSTEN
Armstrong, Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Boker & Co., Inc. H., Montreal, Que.
Firth & Sons, Thos., Montreal Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent Montreal.
Latrobe Electric Steel Co., Latrobe, Pa
Vanadium-Alloys Steel Co., Pittsburgh.

STEEL CHROME VANADIUM
Blancke Co., L. C., New York City.
General Steel Co., Milwaukee, Wis.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Atkins & Co., Ltd., Wm. Sheffield, Eng
Marshall, Son & Bunney, Toronto.

STEEL CHROME NICKEL
General Steel Co., Milwaukee, Wis.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney, Toronto.

STEEL CASTINGS
Joilette Steel Co., Montreal, Que.
Kennedy & Sons, Wm., Owen Sound.
Electric Steel & Metals Co., Welland.
Nova Scotia Steel & Coal Co., Windsor.
Swedish Crucible Steel Co., Windsor.

STEEL, COLD ROLLED
Atkins & Co., Ltd., Wm., Sheffield, Eng
Can. Drawn Steel Co., Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Rice Lewis & Son, Toronto, Ont.
Swedish Steel & Importing Co. Ltd., Montreal.
Union Drawn Steel Co., Hamilton, Ont.

STEEL, NICKEL
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blancke Co., L. C., New York City
Firth & Sons, Thos., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.

STEEL, HIGH SPEED
Armstrong-Whitworth of Can., Montreal.
Blancke Co., L. C., New York City
Wm. Atkins & Co., Sheffield, Eng.
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks Morse Co., Montreal
H. A. Drury Co., Ltd., Montreal.
Firth & Sons, Thos., Montreal, Que.
Hawkridge Bros. Co., Boston, Mass.
Illingworth Steel Co., J., New York.
Latrobe Electric Steel Co., Latrobe, Pa
Marshall, Son & Bunney, Toronto, Ont.
Plomer, Ltd. Winnipeg, Man.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Swedish Steel & Importing Co., Ltd., Montreal.
Vanadium-Alloys Steel Co., Pittsburgh.

STEEL, CHROME, MANGANESE
Joilette Steel Co., Montreal, Que.

STEEL, OPEN HEARTH
Illingworth Steel Co., John, New York.

STEEL, CRUSHED
Pittsburgh Crushed Steel Co., Pittsburgh.

STEEL, ROCK DRILL
Armstrong, Whitworth of Canada, Montreal, Que.
Kayser Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

STEEL, STRUCTURAL
Algoma Steel Corp., Sault Ste. Marie.
MacKinnon Steel Co., Sherbrooke, Que.

STEEL, TOOL
Armstrong, Whitworth of Can., Montreal.
Atkins & Co., Wm., Sheffield, Eng.
Blancke & Co., L. C., New York City.
Boker & Co., Inc., H., Montreal, Que.
Can Fairbanks-Morse Co., Montreal.
Drury Co., H. A., Montreal, Que
Firth & Sons, Thos., Montreal, Que.
Hawkridge Bros. Co., Boston, Mass.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto, Ont.
Norton, Ralph B., Agent, Montreal
Latrobe Electric Steel Co., Latrobe, Pa.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son Toronto, Ont.
Vanadium-Alloys Steel Co., Pittsburgh.

STEEL, VANADIUM
Wm Atkins & Co., Ltd., Sheffield, Eng.
Armstrong, Whitworth of Can., Montreal.
Drury, H. A., Co., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal
Vanadium-Alloys Steel Co., Pittsburgh.
Wells Bros. of Can., Galt, Ont.

STOCK RACKS FOR BARS, PIPING, ETC.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

STOCKS AND DIES
Butterfield & Co., Inc., Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros., of Can., Galt, Ont.

STOCKS, PIPE
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.
Wells Bros., Co., of Canada, Galt, Ont.

STRAIGHTENING MACHINERY
Baird Machinery Co., Bridgeport, Conn.
Bertrams, Ltd., Edinburgh, Scotland.

STRAND
Page Steel & Wire Co., Adrian, Mich

SURFACE PLATES
Brown & Sharpe Mfg. Co., Providence, R.I.

STRUCTURAL STEEL WORKS
William Hamilton Co., Peterboro, Ont.

SWEDGES AND WEDGES
Whitman & Barnes Co., St. Catharines.

SWITCHBOARDS
Can. General Electric Co., Toronto, Ont.

SWITCHES, RAILWAY
Can. Steel Foundries, Ltd., Montreal.

TABLES, SAND-BLAST
Pangborn Corporation, Hagerstown, Md.

TAPPING MACHINES (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.

TANKS, GASOLINE, KEROSENE AND OIL
Bowser Co., Ltd., S. F., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Dom. Forge & Stamping Co., Walkerville.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Marshall, Son & Bunney, Toronto.

TANKS, LUBRICATING, OIL STORAGE
Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, RUBBER CEMENT
Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, STEEL, WATER PRESSURE
Bowser Co., Ltd., S. F., Toronto, Ont.
Dominion Bridge Co., Montreal, Quebec.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd, Toronto.

TANK WAGONS
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal
Toronto Iron Works, Ltd., Toronto.

TANKS
Can. Ingersoll Rand Co., Ltd., Sherbrooke
Elec. Steel & Metals, Welland, Ont.
MacKinnon Steel Co., Sherbrooke, Que
William Hamilton Co., Peterboro, Ont.

TAPER PINS
Galt Machine Screw Co., Ltd., Galt, Ont.

TAPES, MEASURING
James Chesterman & Co., Ltd., Sheffield, Eng.
Rice Lewis & Son, Toronto, Ont.

TAPPING MACHINES AND ATTACHMENTS
Bertram, John & Sons Co., Dundas.
Bicknell-Thomas Co., Greenfield, Mass.
Rudel-Belnap Mach. Co., Ltd., Montreal.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchy Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York.
Rickert-Shafer Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.
L. S. Starrett Co., Athol, Mass
Whitney Mfg. Co., Hartford, Conn.
Williams & Wilson, Limited, Montreal.

TAPES, MEASURING, STEEL AND WOVEN
Lufkin Rule Co. of Can., Windsor, Ont.

TAPES, POCKET
Lufkin Rule Co. of Can., Windsor, Ont.

TAPS, ADJUSTABLE
Boker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Geometric Tool Co., New Haven.
Modern Tool Co., Erie, Pa.
Murcher Machine & Tool Co., Detroit.
Pilot Steel & Tool Co., Montreal, Que.
Victor Tool Co., Waynesboro, Po.

TAPS, GUN, HAND, BOILER
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, MACHINE RELIEVED
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, MACHINE SCREW
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont

TAPS, PIPE
Butterfield & Co., Inc. Rock Island, Que
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Greenfield Tap & Die Corp., Greenfield.
Marshall, Son & Bunney, Toronto
Wells Bros. of Can., Galt, Ont.

TAPS, STAYBOLT, TAPPER
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.

TAPS, DIES AND WRENCHES
Butterfield & Co., Rock Island, Que.
Blancke Co., L. C., New York City.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Foss Mchy. & Sply. Co., G. F., Montreal.
Geometric Tool Co., New Haven
Greenfield Tap & Die Corp., Greenfield.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa
Morse Twist Drill & Mchy. Co., New Bedford, Mass.
Murchey Machine & Tool Co., Detroit.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Starrett Co., L. S., Athol, Mass
Taylor, J. A. M., 318 Stair Bldg., Toronto
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

TAP EXTRACTORS
Walton Co., The, Hartford, Conn.

THERMOMETERS, INDUSTRIAL ENGRAVED TEMPERATURE AND PRESSURE
Taylor Instrument Co., Rochester, N.Y.

THERMOMETERS, RECORDING AND INDEX
Bristol Co., Waterbury, Conn., U.S.A.
Taylor Instrument Co., Rochester, N.Y.

TESTING INSTRUMENTS, METALLURGICAL
Shore Instrument & Mfg. Co., New York.

TENOVERS
Oliver Machy. Co., Grand Rapids, Mich.

TESTING LABORATORIES
Toronto Testing Laboratory, Toronto.

THREAD-CUTTING MACHINES
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Garlock-Walker Mach. Co., Ltd., Toronto.
Geometric Tool Co., New Haven.
Jardine & Co., Ltd., A. B., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National-Acme Co., Cleveland, Ohio.
National Machy. Co., Tiffin, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

THREADING TOOLS
Butterfield & Co., Inc. Rock Island, Que
Greenfield Tap & Die Corp., Greenfield.
Landis Machine Co., Waynesboro, Pa.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. of Canada, Galt, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

THREADING MACHINES FOR BOLTS, NUTS AND PIPES
Greenfield Tap & Die Corp., Greenfield.
Wells Bros. Co. of Canada, Galt., Ont.
Williams & Wilson, Ltd., Montreal, Que.

THREAD MILLING MACHINES
Taft-Pierce Mfg. Co., New York, N.Y.
Gray Ball Bearing Co., Ltd., Toronto.
Smalley-General Co., Bay City, Mich.

THUMB SCREWS AND NUTS
See Screws.

TINSMITHS' TOOLS
Brown, Boggs & Co., Hamilton, Can.
Williams & Wilson, Ltd., Montreal, Que.

TIRE BENDERS
Jardine & Co., Ltd., A. B., Hespeler.

TIRE SETTING MACHINES, HYDRAULIC
Perrin, Ltd., William R., Toronto.
West Tire Setter Co., Rochester, N.Y.

TOOL CASES
Rice Lewis & Son, Toronto, Ont.

TOOL HOLDERS
Aikenhead Hardware Co., Toronto, Ont.
Cleveland Twist Drill Co., Cleveland.
Armstrong Bros. Tool Co., Chicago.
Gisholt Machine Co., Madison, Wis.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

TOOL POSTS, LATHE
Armstrong Bros. Tool Co., Chicago.
Williams & Co., J. H., Brooklyn, N.Y.

TOOL ROOM PARTITIONS
Canada Wire & Iron Goods Co., Hamilton.

TOOLS, BENDING
Peck, Stow & Wilcox Co., Southington.

TOOLS, BLACKSMITHS'
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son Toronto, Ont.

TOOLS, ADJUSTABLE BORING
Kelly Reamer Co., Cleveland, O.
Williams & Wilson, Ltd., Montreal, Que.

TOOLS, ELECTRIC
Independent Pneumatic Tool Co., Chicago.
Williams Machy. Co., A. R., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.
U. S. Electrical Tool Co., Cincinnati, O.

TOOLS, FORMING
Davidson Tool Mfg. Co., New York, N.Y.

TOOLS, LATHE, PLANER, SLOTTER
Armstrong Bros. Tool Co., Chicago.
Gisholt Machine Co., Madison, Wis.
Williams & Co., J. H., Brooklyn, N.Y.

TOOLS, SCREW MACHINE
Foster Machine Tool Co., Elkhart, Ind.

TORCHES, BLOW
Int. Mach. & Supply Co., Ltd., Montreal.

TORCHES, STEEL
Armstrong, Whitworth of Can., Montreal.
Prest-O-Lite Co., Inc., Toronto, Ont.
Welding & Supplies Co., Montreal, Que.

TORCHES, GASOLINE, KEROSENE AND ALCOHOL
Turner Brass Works, Sycamore, Ill.

TRACK SYSTEMS
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.

TRADE MARKS
Shipman & Co., H. C., Ottawa.

TRANSFORMERS
Can. General Electric Co., Toronto, Ont.
MacGovern & Co., Montreal, Que.

TRANSMISSION CHAIN
Morris Chain Co., Ithaca, New York.

TRANSMISSION MACHINERY
American Pulley Co., Philadelphia, Pa.
Can. Link-Belt Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Can. Drawn Steel Co., Hamilton, Ont.
Coventry Chain Co., Coventry, England.
Hamilton Gear & Machine Co., Toronto.
Jones & Glassco, Montreal.
Kennedy & Sons, Wm., Owen Sound, Ont.
Morse Chain Co., Ithaca, N.Y.
Wilson & Co., J. C., Belleville, Ont.
Williams Machinery Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

TRANSMISSION ROPE
Jones & Glassco, Montreal, Que.
MacKinnon Steel Co., Ltd., Sherbrooke.
Wilson & Co., J. C., Belleville, Ont.

TRANSMISSION TOWERS
Curtis Pneumatic Machy. Co., St. Louis.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Northern Crane Works, Walkerville.
Tallman Brass & Metal Co., Hamilton.

TROLLEYS
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.
Wright Mfg. Co., Lisbon, Ohio.

BUYERS' DIRECTORY

TRUCKS, FACTORY, FREIGHT, ETC
Canada Machinery Corp., Galt, Ont.
Chapman Double Ball Bearing, Toronto.
MacKinnon Steel Co., Sherbrooke, Que.
Rice Lewis & Son, Toronto, Ont.

TRUCKS, LUMBER AND KILN
Swedish Steel & Imp'ting Co., Montreal.
Northern Crane Works, Walkerville

TUBING, SEAMLESS, BRASS AND COPPER
Standard Tube & Tube Co., Woodstock.
Taliman Brass & Metal Co., Hamilton

TUBING COILERS, FLEXIBLE METAL
Almond Mfg. Co., Ashburnham, Mass.

TURRET MACHINES, LATHES
Brown & Sharpe Mfg. Co., Providence
Garlock-Walker Machinery Co., Toronto
Greenfield Tap & Die Corp., Greenfield
Oliver Machy. Co., Grand Rapids, Mich.
Pratt & Whitney, Hartford, Conn
Wells Bros. of Canada, Galt, Ont.
Williams & Wilson, Ltd., Montreal, Que.

TURBINES, HORIZONTAL
Wilson & Co., J. C., Belleville, Ont.

TURBO GENERATOR UNITS
MacGovern & Co., Montreal, Que.
Warner & Swasey, Cleveland, O.
Garvin Machine Co., New York.

TURNBUCKLES
Canada Fdrs. & Forg., Ltd., Welland.
Morrow Screw & Nut Co., Ingersoll, Ont.
Rice Lewis & Son, Toronto, Ont.

TURNTABLES
Can. Link-Belt Co., Toronto, Ont.
Elec. Steel & Metals, Welland, Ont.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

TWIST DRILLS
Butterfield & Co., Inc., Rock Island, Que.
Bianchi Co., L. C., New York City

UPSETTING AND BENDING MACHINERY
Bertram & Sons Co., John, Dundas
Brown, Boggs Co., Ltd., Hamilton, Can.
Ford Smith Machine Co., Hamilton, Ont.
Garlock Walker Machinery Co., Toronto.
Jardine & Co., A. B., Hespeler, Ont.
National Machy. Co., Tiffin, O.
Canada Machinery Corp., Galt, Ont.
Niles-Bement Pond Co., New York.
Williams Machy. Co., A. R., Toronto
Williams & Wilson, Ltd., Montreal, Que.

VALVE LEATHERS
Graton & Knight Mfg. Co., Montreal

VALVE GRINDERS (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.

VALVES, HYDRAULIC
Metalwood Mfg. Co., Detroit, Mich.

VENTILATING APPARATUS
Brantford Oven & Rack Co., Brantford.
Can. Blower & Forge Co., Kitchener, Ont.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

VENTILATORS
H. H. Robertson, Ltd., Sarnia, Ont

VISE STANDS, PORTABLE
Williams & Co., J. H., Brooklyn, N.Y.

VISES, BENCH
Aikenhead Hardware Co., Toronto, Ont.
Becker Milling Machine Co., Boston, Mass.
Enss Machy. & Sply. Co., G. F., Montreal.
Williams & Wilson, Ltd., Montreal, Que.

VISES, PIPE
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Rock Island, Que.
Marshall, Son & Bunney, Toronto.
Wells Bros. Co. of Canada, Galt, Ont.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

VISES, MILLING MACHINE
Brown & Sharpe Mfg. Co., Providence, R.I.

VISES, PLANER AND SHAPER
Aikenhead Hardware Co., Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Williams & Wilson, Ltd., Montreal, Que.

WASHER MACHINES
National Machy. Co., Tiffin, Ohio

WASHERS
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Barnes, Wallace, Co., Bristol, Conn.
Graton & Knight Mfg. Co., Worcester.
Kayser Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto
J. Morrow Screw & Nut Co., Ingersoll, Ont.
Norton, Ralph B., Agent, Montreal
London Bolt & Hinge Wks., London, Ont.
Steel Co. of Canada, Ltd., Hamilton, Ont.

WASTE
Wilkinson & Kompass Hamilton, Ont.
Wood Turret Machine Co., Brazil, Ind.

WATER-INTAKE SCREENS
Can. Link-Belt Co., Toronto, Ont

WATER TOWERS
Toronto Iron Works, Ltd., Toronto

WELDING, WIRE
Page Steel & Wire Co., Adrian, Mich.

WELDING, ELECTRIC, SPOT, BUTT, ETC.
St. Lawrence Welding Co., Montreal
Welding & Supplies Co., Montreal, Que.
Tabor Mfg. Co., Philadelphia, Pa.

WELDING MASKS
Strong, Kennard & Nutt Co., Cleveland

WELDING GOGGLES
Strong, Kennard & Nutt Co., Cleveland.

WELDING RODS AND WIRE
Page Steel & Wire Co., Adrian, Mich.
Welding & Supplies Co., Montreal, Que.

WELDING SUPPLIES
Union Carbide Co., Toronto, Ont.

WHEELS, CAR, STEEL
Elec. Steel & Metals, Welland, Ont.

WHEELS, SPROCKET AND TRACTION
Can. Link-Belt Co., Toronto, Ont.
Williams & Wilson, Ltd., Montreal, Que.

WHEELS, TURBINE, WATER
Elec. Steel & Metals, Welland, Ont.

WHEELS, PRESSED STEEL
American Pulley Co., Philadelphia, Pa.

WHEEL TRUEING TOOLS
Wheel Truing Tool Co., Windsor, Ont.
Williams & Wilson, Ltd., Montreal, Que.

WINCHES
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Hall & Sons, John H., Brantford.
Kennedy & Son, Wm., Owen Sound, Ont
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville

WIRE, CAST STEEL AND MUSIC
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal

WIRE COILING AND POINTING MACHINERY
Baird Machine Co., Bridgeport, Conn
Shuster Co., F. B., New Haven, Conn.

WIRING MACHINES
Quickwork Co., St. Marys, Ohio

WRENCHES, PIPE, POWER
Peck, Stow & Wilcox Co., Southington

WIRE CLOTH AND PERFORATED METALS
Canada Wire & Iron Goods, Hamilton
Page Steel & Wire Co., New York, N.Y.

WIRE FENCING
WIRE, COPPER, CLAD STEEL
WIRE, LINK FABRIC
Page Steel & Wire Co., Adrian, Mich

WIRE FORMING AND STAMPING MACHINERY
Baird Machine Co., Bridgeport, Conn.
Brown, Boggs Co., Ltd., Hamilton, Can.
Shuster Co., F. B., New Haven, Conn.

WIRE NAILS
Page Steel & Wire Co., New York, N.Y.
Parmenter & Balch Co., Gananoque.
Steel Co. of Canada, Ltd., Hamilton, Ont.

WIRE NAIL MACHINERY
National Machy. Co., Tiffin, Ohio.
Page Steel & Wire Co., New York, N.Y.

WIRE, SPARK PLUG, MANGANESE NICKEL, COPPER NICKEL, MONEL METAL
Can. Driver-Harris Co., Ltd., Walkerville

WIRE SPRING
Page Steel & Wire Co., Adrian, Mich.

WIRE STEEL, BRASS, COPPER
Page Steel & Wire Co., New York
Steel Co. of Canada, Ltd., Hamilton, On.

WIRE, TELEPHONE, TELEGRAPH, GALVANIZED AND ELECTRICAL
Page Steel & Wire Co., Adrian, Mich.

WIRE, WEAVING, MONEL METAL, BRASS, COPPER, GOLDEN BRONZE, HIGH BRASS, LOW BRASS, NICKEL
Can. Driver-Harris Co., Ltd., Walkerville.

WOOD BORING MACHINES
Canada Machinery Corp., Galt, Ont.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock Walker Machinery Co., Toronto
Williams & Wilson, Ltd., Montreal, Que.

WIRE STRAIGHTENERS AND CUTTERS
Baird Machine Co., Bridgeport, Conn.
Brown, Boggs Co., Ltd., Hamilton, Can.
Shuster Co., F. B., New Haven, Conn

WOODWORKING MACHINERY
Canada Machinery Corp., Galt, Ont
Can. Fairbanks-Morse Co., Montreal
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Machinery Co., Toronto.
Oliver Machy. Co., Grand Rapids, Mich.
Silver Mfg. Co., Salem, Ohio.
Williams Machy. Co., A. R., Toronto
Williams & Wilson, Ltd., Montreal, Que.

WOOD TRIMMERS AND LATHES
Oliver Machy. Co., Grand Rapids, Mich

WOOD MILLING MACHINES AND SHAPERS
Oliver Machy. Co., Grand Rapids, Mich.

WRENCHES
Williams & Co., J. H., Brooklyn, N.Y.
Armstrong Bros. Tool Co., Chicago, Ill
Butterfield & Co., Rock Island, Que.
Canada Fdrs. & Forg., Ltd., Welland
Kerstone Mfg. Co., Buffalo, N.Y.
Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Co., St. Catharines.
Whitman & Barnes Mfg. Co., Akron, O.

WOVEN STEEL PARTITIONS
Page Steel & Wire Co., Adrian, Mich

WRENCHES, AUTOMOBILE, NARROW JAW, MONKEY, SCREW
Morrow Screw & Nut Co., Ingersoll, Ont.
Whitman & Barnes Co., St. Catharines

WRENCHES, PIPE, MONKEY, TAP AND POWER
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Aikenhead Hardware Co., Toronto, Ont.
Marshall, Son & Bunney, Toronto
Peck, Stow & Wilcox Co., Southington.
Rice Lewis & Son, Toronto, Ont.
Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Co., St. Catharines
Williams & Co., J. H., Brooklyn, N.Y.
Kerstone Mfg. Co., Buffalo, N.Y.
Whitman & Barnes Mfg. Co., Akron, O.
Williams & Wilson, Ltd., Montreal, Que.

WRENCHES, SOCKET
Williams Machy. Co., A. R., Toronto.
Williams & Co., J. H., Brooklyn, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

INDEX TO ADVERTISERS

Continued from Page 160

Taubman Brass & Metal Co. . . 91
Toledo Machine Tool Co. . . 140
Tower Tool Co., J. A. M. . . 91
Tweedy, Frank, Inc. . . 89
Tweedy Iron Works . . . 91
Twaddell Testing Laboratory, L'd . . 158
Toronto Tool Co. . . 99
Tuckett Tobacco Co. . . 140

U

Union Mfg. Co. . . 130
United Hammer Co. . . 136
United States Electrical Tool Co. . . 42
United States Machine Tool Co. . . 29
Universal Grinding Machine Co. . . 138

V

Vanadium Alloys Steel Co. . . 26
Victoria Foundry Co. . . 95
Vulcan Mfg. Co. . . 81C

W

Walcott Lathe Co. . . 41
Walton Co., The . . . 146
Warner & Swasey Co. . . 33
Welland, City of, 8A, 8B, 81A, 81D
Welding & Supplies Co. . . 91
West Tire Setter Co. . . 118
Wheel Truing Tool Co. . . 137
Whitcomb-Blaisdell Mach. Tool Co. 129
Whitney Mfg. Co. . . 10
Wickes Bros. . . 139
Wilkinson & Kompass . . 137
Williams Co., A. R. . . 71
Williams & Co., J. H. . . 132
Williams Tool Co. . . 114
Wilson Mfg. Co., T. A. . . 137
Wilson & Co., J. C. . . 145
Witt Twist Drill Co. . . 7
Wisconsin Electric Co. . . 5
Wood Turret Machine Co. . . 138
Worcester Lathe Co. . . 35

Z

Zenith Coal & Steel Products . . 88

If interested tear out this page and place with letters to be answered.

INDEX TO ADVERTISERS

A

Acme Machine Tool Co. 8
Aikenhead Hardware Co. 75
Algoma Steel Corp. Co. 4
Allentown Experimental Works.... 88
Almond Mfg. Co. 129
American Lead Pencil Co. 101
American Pipe Bending Machine Co. 108
American Jullley Co. 140
Armstrong Bros. Tool Co. 118
Atlas Press Co. 87
Audel & Co., Theo. 87
Aurora Tool Works 149

B

Baird Machine Co. 138
Barnes Co., W. F. & John 149
Barnes Co., Wallace 100
Beatty & Sons, M. 81B
Becker Milling Machine Co. 104
Belleaue Industrial Furnace Co.... 151
Bernard Industrial Co., A. 153
Bertram & Sons Co., John 1
Berliams, Ltd. 87
Bicknell-Thomas Co. 128
Blancke Co., L. C. 36
Bowser Co., Ltw., S. F. 126
Brantford Emery Wheel Co. 139
Brantford Oven & Rack Co. 85
Bristol Company 136
Bristol Machine Tool Co. 125
Broadbent & Sons, Ltd., Thomas.. 135
Brockville Foundry Co. 138
Brown & Sharpe Mfg. Co. 143
Brown, Boggs Co. 11
Brown Engineering Corp. 91
Bryant Chucking Grinder Co. 136
Budden, Hanbury A. 85
Muttonfield & Co., Inc. 131

C

Can Billings & Spencer 83C
Canada Foundries & Forgings, Ltd. 13
Canada Machinery Corporation.....
Outside back cover
Canada Metal Co. 130
Canada Wire & Iron Goods Co.... 111
Canadian Cartridge Co. 113
Can. Consolidated Rubber o. 83
Can. Desmond-Stephan Co. 40
Can. Drawn Steel Co. 91
Can. Driver Harris Co., Ltd. 92
Can. Fairbanks-Morse Co. 46
Can. Graton & Knight Co. 43
Can. Ingersoll-Rand Co. 6
Can. Sander Mfg. Co. 140
Can SKF Co., Ltd. 16, 17
Can. Steel Foundries Ltd. 9
Can. Winkley Co. 137
Carlyle Johnson Machine Co. 8
Chapman Double Ball Bearing Co... 97
Cincinnati Electrical Tool Co..... 137
Cincinnati Milling Machine Co..... 116
Cisco Machine Tool Co. 132
Classified Advertising 92
Cleveland Twist Drill Co. 122, 123
Clipper Belt Lacer Co. 37
Commercial Camera Co. 101
Consolidated Optical Co. 137
Cook, A. S. 137
Coventry Chain Co. 158
Curtis Pneumatic Mach. Co. 29
Cushman Chuchk Co. 130

D

Darling Bros., Ltd. 136
Davidson Mfg. Co., Ltd., The Thos. 71
Davidson Tool Mfg. Corp. 39
Davis-Bournonville Co. 139
Diamond Saw & Stamping Works... 31
Dickow, F. C. 87
Dominion Foundries & Steel Co.... 111
Dom. Forge & Stamping Co., Ltd... 40
Drury Co., H. A. 19
Dunbar Bros. Co., The 10

E

Eastern Machine Screw Corp. 130
Electric Steel & Metals Co..... 18
Elliott & Whitehall 91
Espen Lucas Machine Works 36

F

Fellows Gear Shaper Co. 147
Fetherstonhaugh & Co. 85
Firth & Sons, Thos. 9
Fitchburg Grinding Mach. Co. 138
Ford Chain Block & Mfg. Co..... 29
Ford-Smith Machine Co. 10
oss Mach. & Supply Co., Geo. F.
Inside back cover
Frost Mfg. Co. 136
Forrest, Jackson & Forrest 188
Frost Mfg. Co. .....
Foster Machine Co. 102
Franklin Mfg. Co. 133

G

Galt Machine Screw Co. 95
Garlock-Walker Machy. Co..... 89
Garvin Machine Co. 157
Geometric Tool Co. 73
Gilbert & Barker Mfg. Co. 105
Gishoit Machine Co. 44, 45
Goodyear Tire & Rubber Co.....22, 23
Gooley & Eflund, Inc. 107
Grant Gear Works 138
Grant Mfg. & Machine Co..... 126
Grafon & Knight Mfg. Co. 43
Greb Company 85
Greenfield Machine Co..... 115
Greculeafs, Ltd. 87

H

Hall & Sons, Ltd., John H. 14
Hamilton Co., Wm. 99
Hamilton Gear Co., Ltd. 104
Hanna & Co., M. A. 9
Hardinge Bros. 120
Hawkridge Bros. 86
Heald Machine Co. 25
Hendey Machine Co. 160
Henry & Wright Mfg. Co. 126
Hepburn, John T. 145
Hinckley Machine Works 137
Hoefer Mfg. Co. 24
Homer & Wilson 91
Hoyt Metal Co. 24
Hull Iron &Steel Foundries, Ltd. 113
Hunter Saw & Machine Co. 31
Hungerford Brass & Copper Co.,
U. T. 85, 88
Hurlburt-Rogers Machinery Co. 21

I

Illingworth Steel Co., John 13
Illinois Tool Works 79
Independent Pneumatic Tool Co. ... 149
Indicating Calipers Co. 125
Ingersoll File Co. 111
International Malleable Iron Wks. 81
International Mach. & Supply Co... 89
International Machinery Exposition. 98

J

Jacobs Mfg. Co. 127
Jardine & Co., A. B. 13
Johnson Machine Co., Carlyle..... 8
Joliette Steel Co. 137
Jones & Glasseo 97
Joyce-Koebel Co. 94

K

Kaine Foundry Co. 24
Kayser, Ellison & Co. 12
Kearney & Trecker Co. 119
Kelly Reamer Co. 27
Kempsmith Mfg. Co. 2

L

Lancashire Dynamo & Motor Co. ... 115
Landis Machine Co. 95
Landis Tool Co. 108
Latrobe Electric Steel Co. 20
Lindsay, John 87
Long & Allstattter 103
Lufkin Rule Co. 91
LLynd-Farquhar Co. 129

M

MacLean's Magazine 105
Manitoba Steel Foundries, Ltd..... 136
Marion & Marion 85
Marshalltown Mfg. Co. 114
Marshall, Son & Bunney 19
Martin Machinery Co. 99
Matthews & Co., Jas. H. 42
McDougall Co., Ltd., R. 40
McLaren Belting Co., J. C. 138
Mechanical Engineering Co. 105
Metalwood Mfg. Co 38
Milwaukee Shaper Co. 133
Modern Tool Co. 163
Morrow Screw & Nut Co., J. 71
Morris Crane & Hoist Co., Herbert 28
Morse Chain Co. 139
Morse Twist Drill Co. 145
Mouton Mfg. Co. 97

N

National Acme Co. 96
Nicholson File 134
Niles-Bement-Pond....Inside front cover
Northern Crane Works 28
Norton, A. O. 138
Norton Co. 42
Nova Scotia Steel & Coal Co..... 18

O

Oakley Chemical Co. 5
Oliver Machinery Co. 109

P

Page Steel & Wire Co. 139
Pangborn Corporation 135
Parmenter & Buloch Co. 138
Peerless Machine Co. 32
Perrin, Wm. R. 124
Philadelphia Gear Works 139
Pilot Steel & Tool Co. 26
Pink Co., Thomas 116
Plewes, Ltd. 87
Positive Clutch & Pulley Works..... 137
Pratt & Whitney ....Inside front cover
Prest-O-Lite Co. of Canada..... 129
Puro Sanitary Drinking Fountain Co 86

Q

Quickwork Co. 124

R

Racine Tool & Machine Co. 32
Rice Lewis & Son 159
Rickert-Shafer Co. 128
Rockwell Co., W. S. 106
Roelofson Machine & Tool Co..... 15

S

Semple, Robert 128
Seneca Falls Mfg. Co. 101
Shuster Co., F. B. 124
Sidney Tool Co. 118
Silver Mfg. Co. 137
Simonds Canada Saw Co. 116
Skinner Chuck Co. 129
Smalley-General Co., Inc. 35
Smith, N. 85
Smith, W. T. 86
Standard Optical Co. 34
Standard Tube & Fence Co..... 158
Steel Co. of Canada 3
Steinle Turret Machine Co. 112
St. Lawrence Welding Co. 108
Stoll Co., D. H. 136
Strong, Kennard & Nutt Co. 115
Swedish Steel & Importing Co..... 18

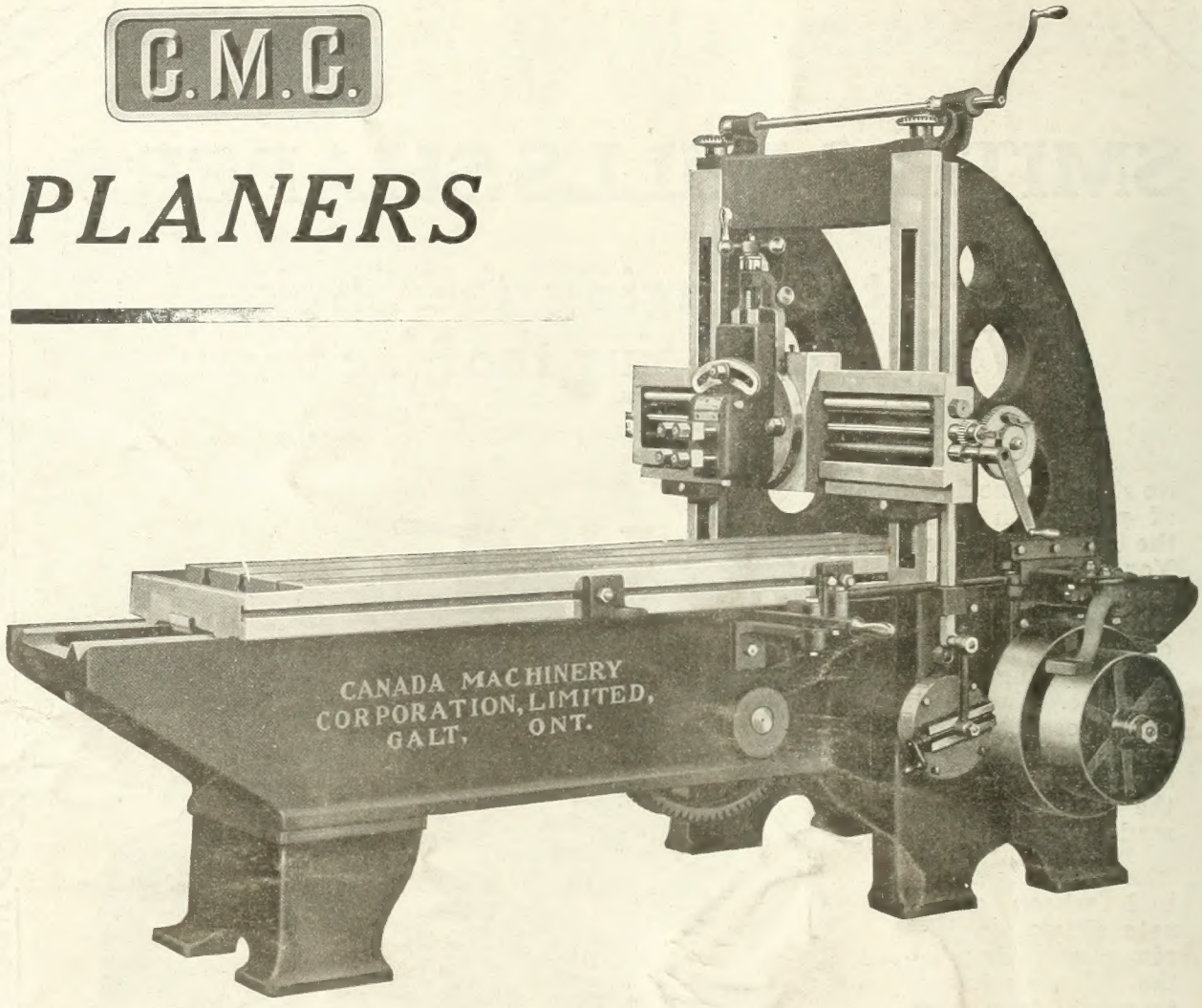
T

Tabor Mfg. Co. 32

Continued on Page 158

C.M.C.

PLANERS



SIZES. The 24″ x 24″ x 6′ planer shown above is the smallest planer manufactured by us. We make them in sizes up to 48″ x 48″ and in lengths to suit customers' requirements.

DRIVES. Machines are regularly built with single speed countershaft and standard drive, but can also be supplied with parallel drive or with two speed countershaft or four speed cone variator. Machines may also be arranged for motor drives as follows: With motor directly connected to first gear shaft; with motor mounted on housings and known as plain motor drive; with motor mounted on top of housings and connected to two or three change gear box, or through cone variator.

"If it is a C.M.C. it is O.K."

CANADA MACHINERY CORPORATION, LIMITED, GALT, ONTARIO

TORONTO OFFICE AND WAREROOMS : BROCK AVENUE SUBWAY